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INDUSTRIAL-ARTS MAGAZINE

Vol. V | JANUARY, 1916 | No. 1

STAND-PAT KING-BOLTS

Wm. Hawley Smith

AFTER I had finished writing this article, I showed it to a lady friend of mine, a woman of large experience and excellent learning; and when she had read the title she said: "I know what 'stand pat' means, but what in the world is a king-bolt?'" And because she, with all her wealth of knowledge, didn't know what a king-bolt is, it struck me that it would be a wise thing, right in the beginning, to explain, to all and sundry readers, what a king-bolt is. So here you are:

A king-bolt is a piece of round iron, about a foot long and an inch-and-a-quarter in diameter, which is used to couple the rear wheels of a wagon to the front wheels thereof. It is such an essential part of a wagon that, without it, a wagon is of no use at all or whatsoever. No king-bolt, no wagon! What relation there is between "stand pat" and "king-bolts," let what follows tell.

It was Bobbie Burns who wrote:

"Oh, wad some Power the giftie gie us
To see ourselves as ithers see us."

A wiser couplet was never penned, and the man or the institution that fails to adopt the sentiment as an efficient force in any working program has missed one of the greatest factors in a worthy life.

I was riding, a few days ago, in the smoking compartment of a Pullman, with one of the prominent businessmen of this country, and we were "swapping yarns," as men will when so conditioned. Truth to tell, such a place and such a time offer the finest opportunity in the world for men and things to show themselves as they really are!

I don't remember just what led up to it; but, somehow, we got to talking about educational matters. To be honest about it, as I review my conversational habits, the evidence seems to convict me of frequently talking about educational matters. I can't imagine why this should be so; but so it is, and that settles it! The principle involved in that statement is worth thinking about, for all and several!

As we talked, it came out that both of us grew up on farms; and, somehow, we got to considering the farm as an educational institution, or a means of developing character in boys and girls, especially boys; and anent this I told of an experience that I had when I was a boy about 14 years old, as follows:

It was during the war, and my father sent me twenty miles away to get a load of green black-walnut lumber. The stuff was in the shape of two-inch planks, twelve inches wide and twelve feet long; and to handle a single one of these pieces took about all the strength I could muster at that time of my life. There were sixteen of these planks, and they made a pretty heavy load for a single team of horses to haul over the primitive Illinois roads of half a century ago.

I got my load on, and started for home, and all went well for a few miles; but as I was crossing a creek (there were no bridges in those days) I was forced to make a sharp turn on a siding place, and in so doing I "cramped" the wagon so much that, with the heavy load I had on, the "king-bolt" broke in the middle, and the front wheels went out from under, letting the forward part of the load fall to the ground, while the rear part stuck up in the air!

And then, to use the vernacular, I "was up against it!" I was in a dense woods, on a seldom-traveled road, miles from any human habitation, and I was all alone! And the question was, what to do about it?

To make a short story of it, here is what I did: I had an axe with me, and with it I made a wooden king-bolt out of a piece of green second-growth hickory which I cut from a handy near-by tree. Then I unloaded those sixteen planks from off the hind wheels, coupled the front wheels into place with my improvised king-bolt, got my load back on again, and once more headed for home. It was after ten o'clock at night when I got there, for it took me hours to do what I have told about in a very few minutes. But I "got there," and I brought with me what my father sent me to get! To be sure, I was supperless, tired and worn to a frazzle; but "I arrived."

Well, that's the story I told the businessman, and I added that I believed it was experiences like that that made men out of boys, and that it seemed to me there was a sort of educational value in the like, which was really worth while.

And when I had said that, my conversational friend remarked: "Yes, the chief trouble with the educational methods of today is that they are all worked out on the idea that king-bolts will always stand pat!"

It was a "businessman" who said this; that is, so far as educational methods are concerned he was one of the "ithers," and that is how he had the "giftie to see us!" I wonder if what he said can "frae mony a blunder free us." I think the suggestion is worth considering.

Right in line with this is a talk I had, not long after, with a Superintendent of a telephone company. He was speaking of the labor problems he had to deal

with, and of how hard it was to get efficient help, even if good wages were paid, and among other things he said:

"But the most difficult thing I have to contend with is to find good 'trouble men.'"

"And what are 'trouble men?'" I asked. And then I went on to say that I had always been led to think that there were always plenty of men who could make trouble in almost any business if there was a scarcity of that commodity!

He laughed, and then went on to explain that "trouble men" were the fellows whose business it is to hunt out and put to rights anything and everything that is wrong, anywhere in any mechanical system, telephone or what not; and then I knew what "trouble men" are.

He said they could get plenty of good men who could do "regular construction work" in first-class shape. Such men, he said, had everything provided for them, they had had training that taught them to do just the same thing, always in just the same way; they had good "bosses" who told them just what to do, and when and how to do it, and they could make good, nearly all of them, under such conditions. "But," he went on to say, "the hard thing is to find men who, when something goes wrong with the plant, can go out and find out just where it is and what it is, and put it into shape, willy-nilly, and not be forever doing it either. You see" he went on, "troubles are hardly ever twice alike. They have a way of turning up in infinite variety. They are always 'exceptions,' and if one only knows 'rules' he can't make good in places where 'the regular thing' don't go!"

I said nothing, and presently this practical man of affairs continued:

"But I don't know as the telephone business is so much unlike other things in this world, when it comes to making good under exceptional conditions! The fact is, that a good big part of any life is more or less out of the ordinary! And I have often wondered if it is possible to fix up some special training for young folks which will help them to handle 'the unusual' successfully. As far as the telephone business is concerned, we are doing what we can to train trouble-men for trouble-work, but it is a sort of up-hill job. Of all the men who undertake what we offer in this line, there isn't one in a dozen, if there is one in twenty, that succeeds at it. I guess that the truth is, men have to be born for such work if they make good at it. But, even so, the thing to do is to hunt 'em out, and sort 'em out, and give 'em the benefit of what others have found out in the line of what they ought to know, and so do the best we can with what we've got!"

As I think over these remarks of his they seem to me chock full of wisdom of the best variety; and I wonder if the principles he suggests can be utilized in school work as this man made them tell in his particular calling.

For instance, I can but wonder if there isn't a tendency in ever so much of our educational work just to train for the regular thing on the theory that all king-bolts will always stand pat! And isn't this specially true of manual training work? Truth to tell, I've seen a good deal of it that looked that way to me! So many, yes, ever so many times I have seen teachers take work out of a pupil's hands and do it for him when some king-bolt had failed to stand pat! And it is lots easier to do it that way! It is a whole lot of bother to make a pupil unload a ton or so of heavy green lumber, and go into the woods and hew out a new king-bolt, fit it into place, load up again, and get home late to supper! It is far easier to figure that king-bolts never will break; or, if they do, to let the lumber, the wagon, the horses and the boy lie a total wreck at the roadside forever and a day! And there are teachers, too many of them, who will do just that thing! I wish it were not so, but I've seen it that way too often to have the nerve to deny the fact. How is it with you, beloved, who read these few lines? That's the point! Stand yourself up in a row, and answer as before God on the Judgment Day, and then see! I mean it!

And a day or two ago I had an expert gas-engine builder home to dinner with me (we, wife and I, have all sorts take dinner with us, now and again. We learn a lot that way.) And, as it chanced, he, too, spoke of trouble-men in his line of work; and after a while he gave some of the details of what he does about it. He told of how he trains trouble-men, something as follows: He said that the first thing they do is to make their men proficient in regular construction work. While the men are learning this, their employers keep a sharp eye on them, and sort out those who seem to have native and special ability for the work they are doing. And it is these men they try to make trouble-men out of, from time to time. Not all such efforts are successful, but some of them are, and that is what they keep trying to do.

I can't go into details, as this man did in telling the things they do to train trouble-men. Briefly, they "make trouble" with engines that are in good condition, and set their men to hunting out what is wrong, and making it right. Practically, they play all manner of machinery tricks on these men, springing the unusual and unsuspected, not to say the impossible on them, in a hundred ways! Fact is, they give them actual experience in trouble-hunting, to the limit of their possibilities and capabilities. Some of the men can stand this test, but many of them fail; and those who can make good in such work are eagerly sought for by those who need such service as they can give, and they command the highest salaries for what they do.

A thing that impressed me in what this man told me, was the most excellent pedagogy his method of finding out and training these men exhibited. As a matter of fact, the best pedagogy the world holds today is practiced in shops and mills, and stores of the best class, the country over. If you doubt that, go into some of these places, and see them train their employes for their work. Indeed, is it not written in the Book of books "The children of this world are wiser in their generation than the children of light?" Of course, professional pedagogs are "children of light," and by the same token business-men are "children of this world," and that proves the proposition. *Quod erat demonstrandum,* as we say in Latin!

And now note this: this man made his men fully efficient in *regular* work before he put them on to trouble-work! Please think of that, teacher! I nearly died in trying to solve the first lot of miscellaneous problems at the end of fractions that I was set to work on. And why? Because there were no two of them alike, and they were nearly all different from anything I had ever learned to do before! They were all trouble-work; and they were sprung on me before I had thoroly learned how to do work that didn't have so very much trouble in it! Pause here, and think a minute, you who teach!

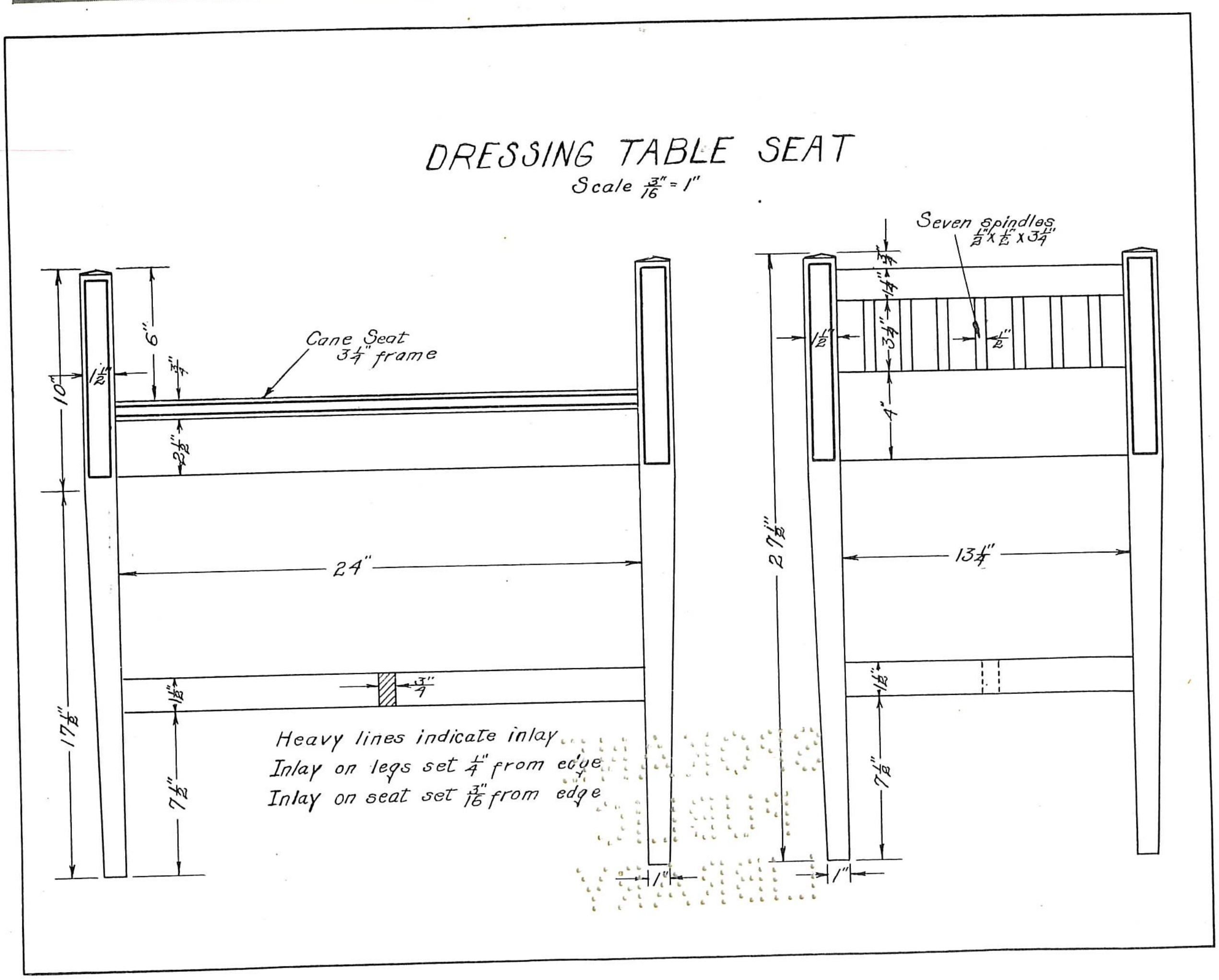
But I need not extenuate. Surely I will not set down aught in malice. What I have written all this for is to raise the question in practical teachers' minds, whether or not it is possible to rightly and profitably introduce into our school methods trouble-work that will yield first-class results for at least some of our pupils? The truth is, that, for the most part, our school work, or most of it as now done, proceeds on the theory that all king-bolts will stand-pat. Is it possible for us to so train our pupils that they can whittle out new and temporary king-bolts, some way, when old ones fail to stand-pat, and so tide matters over for the time being, at least, and thus bring success where failure would otherwise follow?

I wonder? "Oh, wad some Power the giftie gie us" to find out!

PRIZE WINNING FLOAT IN A CIVIC PAGEANT RECENTLY HELD AT PEORIA, ILL.

SMALL DRESSING TABLE,
DRESSING TABLE SEAT
AND FOOT STOOL.

For mill bill of dressing table seat, see Page 7.



INLAYING AS A SHOP PROJECT

C. E. Partch, Des Moines, Iowa

As soon as the boys have developed their mechanical ability to a point where they can follow directions, make good joints, and do good surfacing and finishing, the class in cabinet-making divides itself naturally into two groups. First: Those who have a large number of articles that they wish to make. Usually these articles are things that are needed in the home and the boys are spurred on into making them by their home surroundings and home encouragement. Second: Those boys who have in their homes all the furniture necessary to the comfort of the family and who are at a loss to know where or how to direct their efforts.

The first class is usually larger in number. As a rule, the articles made by them are of the mission type of furniture—all straight lines and flat surfaces. If the instructor has been careful in directing his class in regard to dimensions, proportions, balance, etc., it is this part of the class that will make the greatest showing.

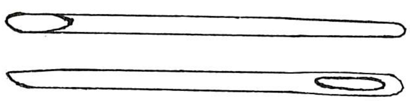


Fig. 1.

The second class, while smaller in number, requires more planning and more careful directing on the part of the teacher. He must present to them some project that will incorporate the principles already acquired, present new problems to master, and have the finished project different from any project of his former experience. One line of work that this second class may be directed into is the adaptation of period furniture. Few shops have sufficient equipment for the making of all styles of period furniture, but all shops are well enough equipped to make a style in which slender tapered legs and a line inlay are the predominating features.

A certain amount of inlay, if used properly, adds materially to the beauty of a piece of furniture. Most boys desire greatly to make some article having an inlaid decoration.

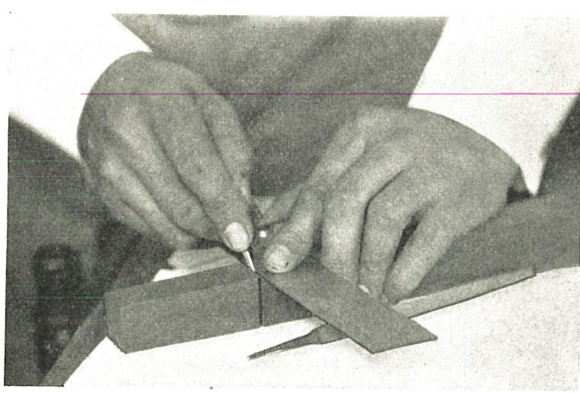


Fig. 2.

Method of Inlaying.

The tools necessary for inlaying are found in any shop. An ordinary marking gauge, in which a special point has been placed instead of the usual spur, is used for grooving with the grain. This special point, shown in Fig. 1, is made of a No. 14 yarn needle by cutting it off where the diameter is greatest, filing it flat on one side, and rounding it off like the back of a spoon on the other. It is then placed in the marking gauge so that it projects thru the beam about 1/8″ or the depth to which the groove is to be cut, and with the flat side of the needle in the direction which the groove is being cut. It is advisable to round off the head of the gauge

Fig. 3.

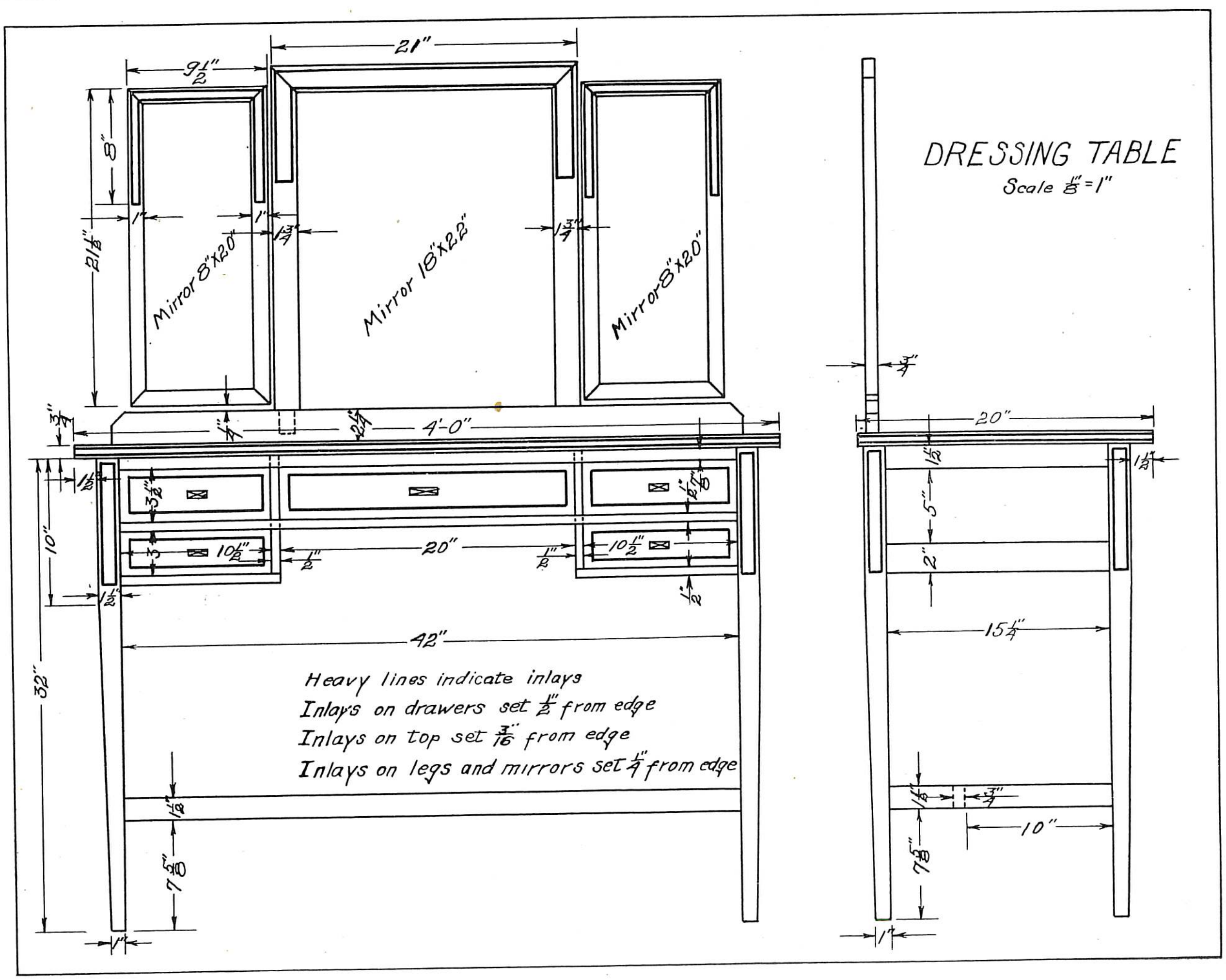
which fits into the palm of the hand, shown in Fig. 4, as it is easier on the hand and enables the workman to hold the gauge more firmly. The gauge is used entirely for grooving parallel to an edge and with the grain. A knife and try-square, or some metal straight edge, should be used to cut the grooves across the grain. Figure 2 shows method of grooving around bottom of table leg. The material to be removed in the groove is chiselled out after each side has been cut to the required depth. A very narrow chisel is necessary. The tang of a slim-taper file, as shown in Fig. 2, is sharpened as a chisel and used as such.

Figure 3 shows method of using gauge and the grooving nearly completed ready for inlaying a table leg.

Holly was used for inlay. Holly comes in sheets four feet long, six to twelve inches wide, and sanded to one-sixteenth of an inch in thickness—just thick enough so that it will wedge into the groove made by the No. 14 yarn needle.

DRESSING TABLE, MUSIC CABINET AND DRESSING TABLE SEAT.

For mill bill of dressing table see Page 7.



Mill Bill.

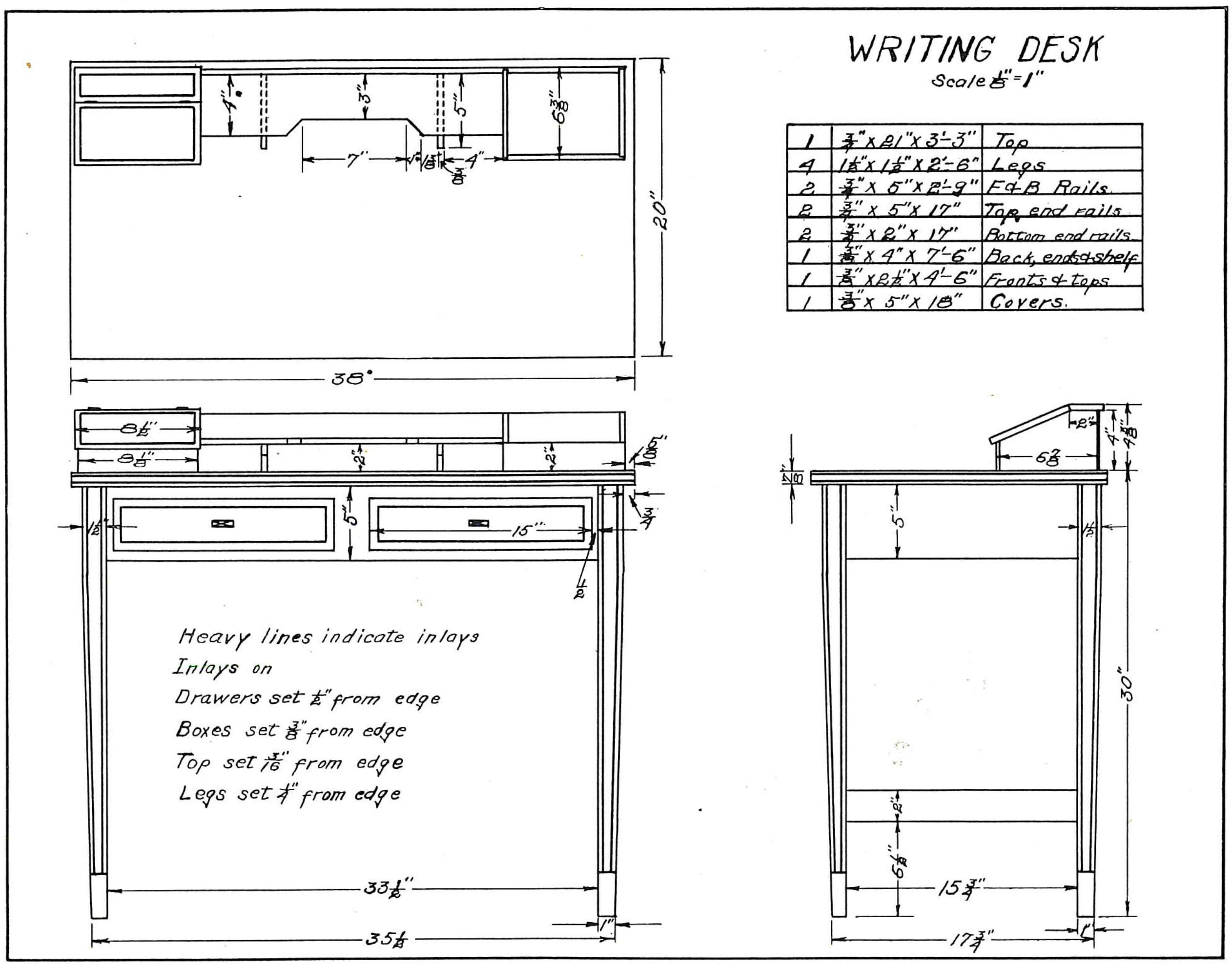
Dressing Table.

4.... 1⅝″x 1⅝″x32½″.......Legs.
3.... ⅞″x 7″ x 4′ 0″.......Top.
2.... ½″x 1½″x 3′ 8″.......Front cross rail.
1.... ¾″x 1½″x 3′ 8″.......Front cross rail.
1.... ¾″x 1½″x 3′ 8″.......Back cross rail.
1.... ¾″x 2″ x 3′ 8″.......Back cross rail.
4.... ¾″x 1½″x17″ ....End cross rail.
2.... ¾″x 2″ x17″ ....End cross rail.
2.... ¼″x 5½″x16″ ....Panels.
1.... ¼″x 5½″x 3′ 6½″.....Panels.
1.... ¾″x 1½″x 3′ 8″.......Spanner.
1.... ¾″x 2¼″x 3′ 6″.......Base of mirrors.
1.... ¾″x 1¾″x 6′ 0″.......Center mirror.
1.... ¾″x 1″ x12′ 0″.......Side mirrors.
2.... ¾″x 3″ x10½″.......Drawer fronts.
2.... ¾″x 3½″x10½″.......Drawer fronts.
1.... ¾″x 3½″x20″ ....Drawer fronts.
4.... ½″x 3″ x16″ ....Drawer sides.
6.... ½″x 3½″x16″ ....Drawer sides.
2.... ½″x 3″ x10″ ....Drawer backs.
2.... ½″x 3½″x20″ ....Drawer backs.
4....10″ x15″ —3 ply......Drawer bottoms.
1....20″ x15″ —3 ply......Drawer bottoms.
2.... 9″ x21″ —3 ply......Mirror backs.
1....19″ x22½″—3 ply......Mirror backs.
2.... ½″x 8¼″x18″ ....Partitions between drawers.
10............................Drawer guides.
1.... $\frac{1}{16}$″x 8″ x 4′ 0″.......Holly for inlay.

Dressing Table Seat.

4.... 1⅝″x 1⅝″x28″ ....Legs.
2.... ¾″x 2½″x26″ ....Side rails.
2.... ¾″x 1¼″x15¼″.......Top end rails.
2.... ¾″x 4″ x15¼″.......Center end rails.
2.... ¾″x 1½″x15¼″.......Bottom end rails.
14.... ½″x ½″x 4″ ....Spindles.
1.... ¾″x 1½″x26″ ....Spanner.
2.... ¾″x 3¼″x25″ ....Seat frame.
2.... ¾″x 3¼″x13″ ....Seat frame.
1.... $\frac{1}{16}$″x 2″ x 4′ 0″.......Holly for inlay.

WRITING DESK.



Strips 3-16" wide are cut from the sheet of holly with the slitting gauge. One edge of the inlay is coated with glue and then pounded into the grooves with a mallet.

Figure 4 shows the table leg as it appears after the inlay has been placed in grooves.

Figure 5 shows the table leg after the glue has dried and the inlaid faces have been surfaced.

Kinds of Wood Used.

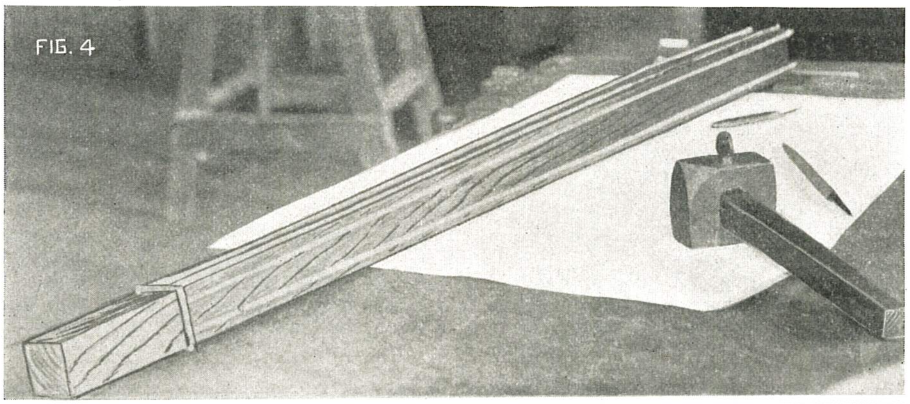
Black walnut and mahogany are probably the two best woods for use in the making of inlaid furniture. In either case holly forms a suitable contrasting wood for the inlay. Selected clear hard maple may also be used for the inlay when holly is not obtainable, but the result is not so pleasing.

Finishing.

Hot linseed oil on inlaid black walnut increases the contrast between the walnut and the holly. After drying, the furniture may be waxed or varnished.

Inlaid mahogany is usually treated with lime to deepen the color of the mahogany without coloring the inlay. As soon as the article has dried after the lime treatment, brush off the surplus lime and treat with hot linseed oil. Then wax or varnish as desired.

The accompanying photographs show the use of line inlay in bedroom furniture as worked out by the pupils in the West High School of Des Moines, Iowa.



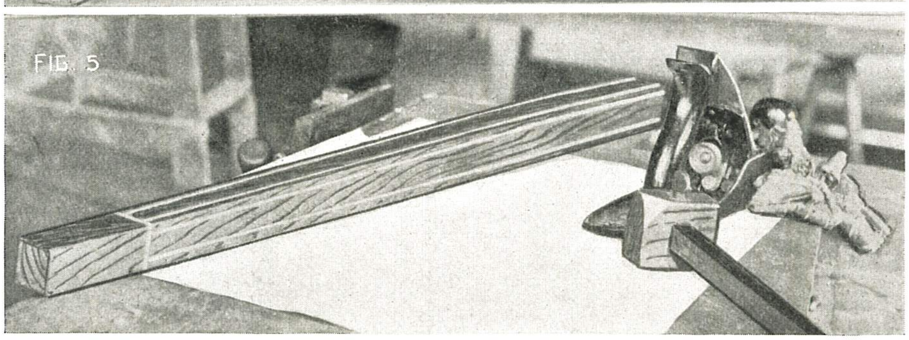
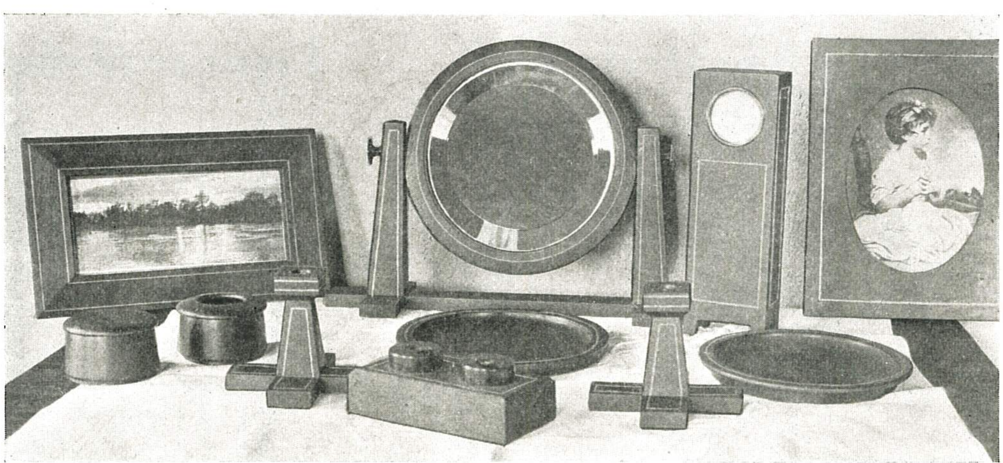
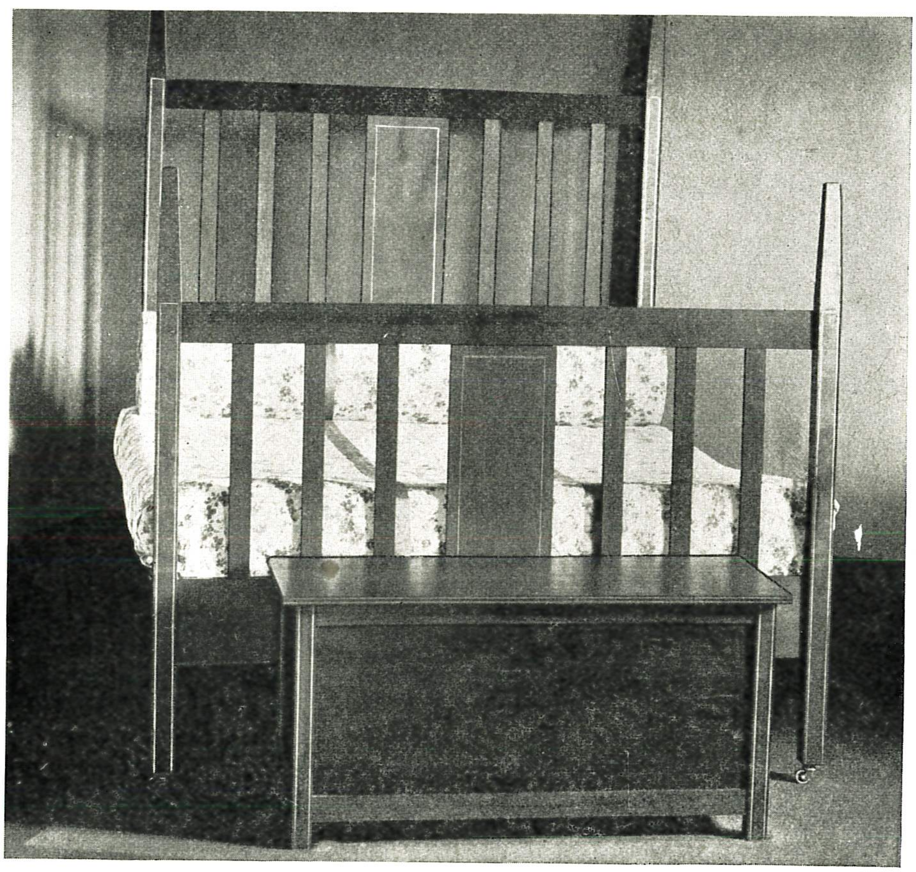


Fig. 4. The Inlay Placed in the Grooves.
Fig. 5. The Inlay Faces Surfaced.



Small Articles, Designed and Inlayed by Mr. Partch's Students.

MIRROR AND CHIFFONIER.



BEDSTEAD AND CEDAR CHEST.

DOMESTIC ARTS IN THE GRADES

Ada I. Gause, Household Arts Department, Pratt Institute

(Second Article)

Fig. 4. Book Cover. Sewing Bag.

THE Book Cover, shown in Fig. 4, affords the teacher opportunity to blend her work with that of the freehand art teacher. It furnishes the child an original problem in working out a design. To be done in cross-stitch on checked gingham.

Note—Much care is exercised by the supervisor in the choice of materials: blue and white checks are more restful to the eye than black and white. For the same reason medium-size checks are preferable to small checks. Various styles of stripes are also trying on the eyes.

In the choice of all color children should be allowed a voice directed by the teacher.

Only materials of good qualities are put in the hands of the children. It gives them an appreciation of the *good;* the *inferior* is taught by contrast and the *excellent* by comparison.

The following outline shows the time for the book-cover proportioned into eight lessons of one and one-quarter hours.

Each proportion indicates the lesson subjects and amount of work to be done.

Materials:

Checkered gingham.
Mercerized floss.
Embroidery needles number 6.
White thread number 80.
Needles number 8.

Measurements:

Measure around book, add twelve inches.
Measure length of book, add one and one-half inches.

Lesson 1.

1. Review basting stitches.
2. Turn four edges for one-quarter inch hem, and baste.
3. Begin hemming.

Lesson II.

1. Review hemming stitches.
   a. Appearance.
   b. Construction.
   c. Application.
2. Continue hemming.

Lesson III.

Prepare book-cover for design:

1. Fit cover on book as if finished, turn extensions inside book.
2. Trace with basting thread all around on edge of book, front only.
3. Remove cover from book; unfold.
4. Work out a design to fit—as to balance and to proportion—the space within the tracing.
5. The design may be made on block paper which has been cut exact size of space on book cover within the tracing.
6. Design to be worked in cross-stitch.

Lesson IV.

1. Demonstrate, cross-stitch, give special attention to underneath side of work.
2. Children practice new stitch.
3. Begin working design.

Lesson V, VI, VII.

Working Periods.

Note—Teacher should avail herself of such opportunities as Lesson V and VI presents to interest the children in the subject of textiles; either by telling stories, short talks or by reading stories of the life and growth of the vegetables and animals upon which we depend for the clothing we wear.

Lesson VIII.

1. Finish book cover.
2. Review overhand stitch, paint bag lessons.*
3. Place cover on book, turn extensions at sides to fit book.
4. Pin hems together at ends of book.
5. Remove cover from book and baste hems together, right side.
6. Overhand hems together.
7. Remove bastings.

Sewing Bag shown in Fig. 4, for use in the sewing class is made of dainty cotton crepe and faced with contrasting material.

Note—Please note that the sewing bag problems differ entirely from the Paint Bag problems.

Steps in Construction:

Material—crepe, thread No. 80, needles No. 8, lawn 2 inches, one and one-quarter yards ribbon.

Dimensions—16 inches on warp, 10 inches on woof; cut on thread of material.

1. Overcast side edges.
2. Fold in half on woof thread.
3. Baste side edges together with even bastings, one-quarter inch seam to within one and three-quarters inches of top.
4. Give lesson on the stitching-stitch (known as the back stitch); practice on pieces of material.
5. Stitch side seams with stitching-stitch as far as basted.
6. Baste and stitch side seams from top down one and one-quarter inches; remove bastings.
7. Cut contrasting material for top facing—two pieces, two inches on warp, and ten inches on woof; baste into circle and stitch.
8. Place right side of facing to right side of bag, top edges together, and seams together; baste with even bastings one-quarter inch from edge.
9. Give lesson on combination stitch, practice stitch on practice piece (three running stitches, one back stitch).
10. Place line of combination stitches on line of basting; remove bastings.
11. Press seams open with fingers; turn facing on seam line.

*Dec., 1915, issue, P. 261.

12. Baste close to turned edge with even basting (exceptional use of even bastings).

13. Turn lower edge of facing wrong side, pin in place, baste close to edge with even bastings; hem with hemming stitch and remove bastings.

14. One-half inch above, place line of running stitches to form casing.

15. Draw ribbon in casing, thru opening on side.

Note—Make special feature of—

1. New stitches.
2. Reviews.
3. Application.

Needles number 9.
Thread number 90.
Ribbon 1¼ inches wide, 1½ yards.
Lace, 1 inch wide, 2¼ yards.

Dimensions:

18 inches on warp thread, length of apron.
24 inches on woof.
3 inches on woof and 16 inches on warp for belt.
Cut lower corners round.

Lesson II.

1. Fold one-eighth inch hem on sides and lower edge.

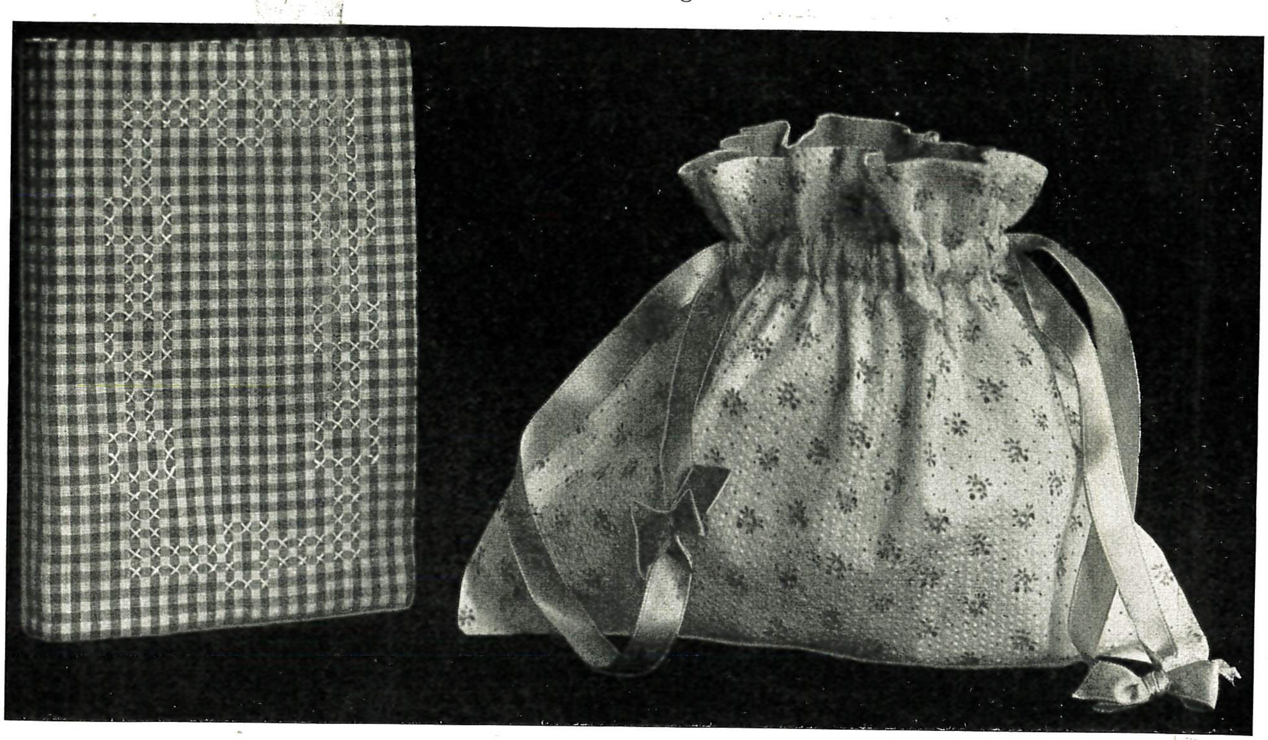


FIG. 4. BOOK COVER. SEWING BAG.

Fig. 5. Apron.

Apron shown in Fig. 5 has been designed to give the child a knowledge of not only new stitches, construction work and its application, but also an appreciation of dainty hand work. Opportunity is afforded the teacher to give talks on textiles. A talk on the construction of cloth is advised as an introductory subject.

The child should be made familiar with the terms "warp" and "woof" and should be able to readily make the test which distinguishes one from the other.

Test—Hold material firmly between thumb and first finger of each hand and pull. The woof thread stretches, the warp threads do not.

A Fixed Rule: Warp threads are placed in a garment the way of the greatest strain. The following outline shows:

(1) The time proportioned into thirteen lessons of one and one-half hours.

(2) Each indicates the lesson subjects.

(3) The amount of work to be done.

(4) The points to be emphasized in class.

Lesson I.

Materials:

White flaxon.

2. Baste hem with even bastings.

Note—Make special point of placing hem on round corner where bastings will necessarily be small running stitches as on all curved edges.

Lesson III.

1. Review Lesson I and II.
2. Review hemming stitch, *lessons on Paint Bag.
3. Practice hemming stitch.
4. Keep model to use later.

Working Period:

Lesson IV.

1. Hemming apron.
2. Points to be observed,
   a. Small stitches correctly made.
   b. Neatness.
   c. The ending of threads and the beginning of new ones.
   d. If knots are used be sure they are hidden.
   e. See that the work is correctly held in the hands.

Lesson V.

1. This period will necessarily be for work, therefore make it interesting and helpful by giving a talk on Lace.

*Dec., 1915, issue, P. 261.

a. Qualities.
b. Prices.
c. Uses, etc.
2. Finish hemming apron.

Lesson VI.

Demonstrate the following:

1. Drawing thread in lace to form scant gathers.

2. Whipping on lace. Hold lace and apron edge parallel.

Class practicing whipping on lace, use model made in Lesson 3.

Instructions to Class:

1. Practice gathering on model used above:

a. Place one row of fine gathers one-eighth inch from top.

b. one-eighth inch below this row place a second row.

Note—To stroke gathers—take each needleful in right hand between thumb and finger. With thumb and finger of left hand, firmly arrange gathers parallel while on needle. (Stroking gathers with pin weakens material.)

FIG. 5. APRON.

Lesson VII.

1. Talk on textiles.
2. Whipping on lace.
3. Points to be observed in the class.

a. Small stitches correctly made.

b. Be careful that the lace is not too full.

c. Join new thread same as in overhanding; do not use knots.

d. See that the lace is correctly held in the hands.

Lesson VIII.

1. Give general review and comprehensive application of all principles so far learned on apron.

2. Finish whipping on lace.

Lesson IX.

Demonstrate:

1. Placing gathers.
2. Stroking gathers.
2. Place gathers in top of apron.
3. Place one row one-eighth inch from top edge of apron; place lock-stitch at center front; see that gathers are carefully stroked.
4. End thread with knot.

One-eighth inch below this line of gathers, place second line of gathers same as first row.

Lesson X.

Placing Belt:

1. Place center front of belt to center front of apron, right side together and pin.

2. Pin apron hems to belt one inch from end of belt.

3. Pull both gathering threads to fit belt; secure threads around pin.

4. Hold gathers toward you; adjust gathers and place pins one inch apart, and parallel with gathers.

5. Baste with even bastings just below first row of gathers.

Lesson XI.

1. Review stitching stitch.
2. Place a line of stitching stitches on the line of bastings.

Lesson XII.

1. Place one-eighth inch hem on ends of belt.
2. Turn one-quarter inch on raw edge of belt.
3. Fold belt in half lengthwise.
4. Place turned edge to line of stitching; pin in place.
5. Replace pins with even bastings.

Lesson XIII.

1. Place hemming stitch on belt.
2. Remove bastings and lower gathering thread.
3. Draw ribbon thru belt.
4. Press apron.
5. Tag apron neatly with name and leave with teacher.

(To be continued.)

Helpful Hints to Supervisors of Manual Training

C. E. Howell, Director Mechanic Arts, Decatur, Ill.

SOMEONE has said: "Red tape is System gone to seed." One of the problems confronting the Supervisor of Public School industrial work is that of keeping all the units, composed of the various shops, cooperating with intelligence and harmony. To accomplish this he must have at hand for quick reference some systematized information coming at frequent intervals from the various shop teachers, together with a ready method of standardizing instructions to be sent out.

The scheme under which these objects are accomplished must be simple and yet comprehensive. It must avoid all unnecessary "Red Tape." It must cover the ground with little flurry and worry to the Supervisor and yet be perfectly clear to the teacher. Along with it must go such cards and blanks as will conserve the Supervisor's time for the more important task of direct visitation, criticism and research which is so peculiarly his. Manual Training can never reach its largest growth while those who are naturally its leaders are smothered in a mass of petty detail and clerical work, in addition to whatever classwork they may be carrying.

To claim that the blanks and cards illustrated herewith are ideal would be the merest folly, yet they represent years of earnest work and have been found very valuable to the writer.

Blank No. 1. The "Teacher's Report" was devised as a combination weekly report, lesson outline for the following week and requisition for supplies. It fulfills all these functions very satisfactorily and simply. One report is made out at the end of each week by each teacher for each *subject* taught, i. e., in the grade work one is made out for the 7b, one for the 7a, one for the 8b, and one for the 8a—provided the teacher has all these sections. The writer has now in one pile, in a section of an ordinary drawer in his desk, these complete reports for the entire semester September, 1914, to January, 1915, from all the teachers in the shops of the high school and the grades in the city of Decatur. Reference to them will show in an instant just what a certain teacher did with a certain class any week in the semester; what he planned for the following week; how much theory he gave; how long the class averaged on a certain model, and what supplies were asked for. These blanks are wonderful time savers and form a vital point of contact between the busy Supervisor and his teachers. They are printed on alternate white and yellow sheets and made up into pads, thus enabling each teacher to keep a yellow carbon copy in his own files.

Blank No. 2. This illustrates the "Daily Class Re-

Teacher's Report
Mechanic Arts Department
Decatur Public Schools
C. E. Howell, Director

__________School. __________Teacher
Report for Week Ending__________19____
Subject__________, Grade______
Models in course of construction__________
Models completed during past week__________
Theory__________
Models to be taken up next week__________
Theory to be taken up next week__________

Quantity	SUPPLIES REQUESTED	Cost
	Total.	

Blank No. 1.

port" which is a modified form of the type used in Cincinnati when the writer was there. One of these is sent back with each grade class reporting at the manual training center. By stopping the class for a moment as they line up to leave the shop and simply reading the report to them, with perhaps a few comments when advisable, the instructor may easily create a feeling of pride among the members of the class in taking back a good

DAILY CLASS REPORT

Mechanic Arts Department

Decatur Public Schools

C. E. HOWELL, Director

__________191__

To the Principal of the__________school:—

The following report of your__________grade class, due at the manual training shop today, is respectfully submitted for your information and approval.

____
Instructor

ABSENT

TARDY

CONDUCT

REMARKS

I have examined and approved the above report as noted

Principal

NOTE:—This report to be signed by Principal and returned within one week from date.

Blank No. 2.

WORK SHEET

MECHANIC ARTS DEPARTMENT

Decatur Public Schools

__________Job No. __________Date.

DESCRIPTION OF WORK WANTED

Kind of Material__________

Finish __________

Sketch Furnished? __________

Wanted by __________

Assigned to __________

Started __________

__________Rate of Pay. __________Completed.

__________Cost of Material. __________Total Hours.

__________Cost of Labor__________

__________Total Cost.

Blank No. 3.

report each time. This is fostered still more if their home teacher takes pains to ascertain from them each time they come back just what their report was. So this blank encourages good conduct, promptness, and attendance, besides being a means of contact between the home school and the manual training center. Incidentally, the return of the report the next week bearing the signature of the principal, absolves us from all further responsibility as to excuses for absences, tardiness, or misconduct. As a permanent record of action taken in cases of discipline it has been known to save the manual training teacher from severe criticism. Also it lets the principal know what each class in the building is doing in the shop.

Blank No. 3. The "Work Sheet" is almost self-explanatory. It is a simple form on which the Supervisor jots down the main details and specifications of various jobs of school work which come in for the shops to do. These forms are printed on alternate white and yellow sheets. The Supervisor fills them out, sends the original to the shop to which the job is assigned and files the carbon copy in his office. The shop teacher takes his copy and puts a certain boy, or group of boys, on the job. If drawings accompany the Work Sheet, well and good. If they do not, it may be necessary to send a boy direct to the person who wants the work done in order to obtain details or exact specifications. We consider this direct contact of our boys with the buyer, and the consequent bickering and questioning, one of the most valuable features of this scheme.

When the job is completed the shop teacher either returns his copy to the Supervisor at once, with the Rate of Pay, Cost of Material, etc., filled out, or files it with others to be embodied in a report at stated intervals.

Blank No. 4, which is a blueprint, altho it might very well be printed, is a device designed to standardize the outlines sent out by the Supervisor to teachers of the grade work. The "Grade" and the exercise "Number" are filled in in the spaces provided. The name of the exercise, such as the "Bread Board," is then written in in the long space as shown. Following down the sheet we learn that the exercise is to be a "Set Model," i. e., the class will not be required to name its essentials, or to construct a definition for it, the complete instructions being given by the teacher. Farther down we read that the maximum size is to be ⅞ inch by 8 inches by 15 inches. In other words, each boy may decide on the size which he will use, subject to approval, but may not exceed in material the dimensions given above. In the same way we may readily learn that the drawing is to be merely a freehand "Shop Sketch"; the finish, plain sandpaper, furnished free; and so on down


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

MECHANIC ARTS DEPARTMENT

Decatur Public Schools

SUPPLY CARD 141

Name John Doe.

Supply Card.


MANUAL TRAINING

7b GRADE. Ex. 1.

Bread Board.

Essentials. Definition. X Set Model.

MAXIMUM Dimensions:- (over all)

7/8 Thickness. 8" Width. 15" Length.

DRAWING:- X Shop Sketch. Mechanical.

DESIGN:-worked out in shop in home.

in drawing class.

Original as to:- dimensions. outlines.

construction. decoration.

FINISH:- stain. wax. varnish. shellac.

X plain sandpaper. charge. X free.

MATERIAL:- X free. charge not furnished.

Poplar.

HARDWARE:- X free. charge not furnished.

One 3/4" Screw Eye.

NEW TOOLS for demonstration.

Jack Plane, Try Square

EMPHASIZE:- Planing to a line.

REMARKS:-

Use Scrap Wood when available.

DECATUR, ILL. 1913. C.E.H.

Blank No. 4.

the page. The illustration given is, of course, very simple, but one may quickly realize how readily this blank may be filled out to suit almost any model. With a good supply of these blanks on hand the Supervisor can outline in a moment, an exercise which would take much writing to define otherwise.

The *"Supply Card"* shown represents a monetary value of 25 cents. Each card is numbered and each teacher provided with a supply at the beginning of the semester and charged with them on the books of the Supervisor. With each batch of cards goes an inexpensive ticket punch. The teacher sells these cards to his pupils at twenty-five cents each. Whenever a boy gets a few cents' worth of material he brings his card to the teacher and has that sum punched out. When his first card is gone he buys a new one. Refunds on unused portions are made at the end of the year from the Supervisor's office.

This provides a simple and accurate means of keeping accounts, both for the teacher and the Supervisor. It avoids the handling of so many small sums, or their recording in books or on slips. At the end of the semester the teacher turns in to the Supervisor all unsold cards and pays for the others.

The devices illustrated above are the results of years of scheming and experimentation, as efficient systematization must always be, but the writer considers he has been many times repaid by the time they have saved, and hopes they may be equally available to the reader.

It may be worth while mentioning that all the above blanks were designed to fit our standard shop notebook, note size, which is used thruout our grades and the high school.

TRULY a boundless significance lies in work whereby the humblest craftsman comes to attain much which is of indispensable use, but which he who is of no craft, were he never so high, runs the risk of missing.—*Thomas Carlyle.*

Organization in the Teaching of Manual and Industrial Arts

An Application of Psychological Analysis and Principles of Scientific Management

Fred D. Crawshaw, University of Wisconsin

(Eleventh Article)

WE are living in an age in which scientific organization of thought and effort is imperative. Life for most of us is complex. No longer can we live entirely by ourselves or wholly for ourselves. The effort which we put forth for a livelihood is expended for others and paid for by others. This is true whether we are numbered among the employed or the employers.

The above statements might have had application one hundred years ago but not in the same *degree* as they do today. It is because we are more dependent upon our neighbors today than formerly, that we need to organize our efforts more completely than did our forefathers. There was a time when all human effort was individual. For the most part it was then unorganized. Later, individual human effort was combined and it became organized more systematically as the tendency toward combination increased. The result has been: Systematic control of collective effort. In the industrial world, a very good example of this development is given in the transition from home industry to organized industry, under the factory system. As the factory system has grown and as specialization in industry has increased, there has been an increasing demand for systematic performances both individual and collective. The time has come in organized industry when man's performance must be not *only systematic but scientific,* in order that there may be no possibility of misspent energy in individual performance or duplication of effort in collective performance.

This is the theory of scientific management. What is it? How can it be applied to the teaching of manual and industrial arts? To answer this question we must know something about psychological analysis and its purpose.

By psychological analysis is meant the morselizing of any structure to determine its detailed parts and the intrinsic value of each part. This requires the ability: First, to determine the *elements* in a situation and, second, to determine *just what* each element is for, or its purpose.

Perhaps one of the best examples of psychological analysis which is familiar to school teachers is the analytical study of subject matter in school curricula to determine the purpose of each school subject. For years educators have been attempting to evaluate the subjects of the elementary and high schools in terms of mental values. Whenever a seemingly satisfactory set of values has been established, the next step has been to determine upon a means of most effectively presenting each subject that these values might develop as the result of instruction. For example, it has been estimated that arithmetic has certain values and that these values as compared with the same or similar ones, accruing from the study of English composition, let us say, are not as good or perhaps better. It has then been estimated, further, that to establish these values most effectively arithmetic should be taught in a particular way, at a particular time in the school process, or in a particular place; as for example, in the classroom, in the science laboratory, or in the shop.

It is just this sort of consideration with reference to subjects in the manual and industrial arts and the best means of presenting them, that is involved in psychological analysis and the application of the principles of scientific management. Analysis is necessary to determine scientific procedure. This kind of procedure may not result from analysis however. Arithmetic was valuable before an educational scale was made to measure the results of teaching arithmetic. The analysis alone, therefore, is not constructive except as it determines elements which can be rearranged in a new and different structure as a more effective means of securing the particular value. An organization and a succeeding administration or management which is scientific, therefore, must be based upon analysis.

In the field of manual and industrial arts there has been an analysis of tools and their processes. All of the early courses of study in manual arts were developed upon the basis of tools and the analysis of tool processes. Such courses were scientifically organized. If then we apply the scientific test to our present courses of study, provided these courses retain the elements of the earlier courses, will they not be found satisfactory? No. Why? Because the great change in industrial conditions since the time of the organization of these earlier courses has likewise made a change—and an equally great one—in the social and economic conditions under which we live and consequently under which children live who take work in manual and industrial arts. It must be apparent then that while the old analysis of tools and tool processes is still needed there must be a further analysis, one which deals with the conditions under which courses are given—one which will take account of the relation between theory and practice in manual arts and of the great variety of tools and their applications in a multitude of industries. This further analysis is necessary in order that our courses of study and our practice in using them may stand the present day psychological, social and economic tests.

We are accused by industries of being impractical. We are accused by our educational colleagues of not being psychological. In other words the manual and industrial arts are being questioned as to their *educational* values. They have not had the careful scrutiny of the analyst. This cannot be said of many of the older subjects found in the school curriculum. We now have our educational scales for handwriting, drawing, arithmetic, composition, etc. Why not educational scales for the manual and industrial arts? Not that the analyst or the scales are

necessary to make manual and industrial arts fulfil their highest purpose, become of greater value as an educational means or become practical, but that they may be measured by the *same kind of a scale* as are other school subjects and, further, that those who are responsible for them *may improve them* if they do not measure up to their capacity. Indeed the big task is synthetic or constructive, rather than analytic. It is in making a new structure or organization (also a scientific procedure), after the old one is torn down, that shall produce the required results.

When educational scales for the different manual arts subjects are produced we shall determine with considerable accuracy the *value* of our subject matter in terms of educational standards; and by the application of the principles of scientific management we should then make them more effective educationally and industrially. In a recent volume by Dr. Chas. H. Judd of the University of Chicago, on the Psychology of High School Subjects he devotes a chapter to Manual Skill: Practical and Theoretical Experience, and one to Industrial Subjects. In these he gives us the warning that our subject (or better subjects) must be analyzed and tested. The following quotations give his thought in this connection.

Referring to sequented projects in a course of study in some line of shopwork:

"Progression within the course is one of the greatest advantages that the older and more highly organized subjects present in the course of study. If manual training cannot in some way secure the same type of progressive interest, it will never commend itself as a school subject."

Referring to contentions relative to the educational value of manual arts:

"The problems suggested by these various contentions regarding handwork in the schools never called more urgently for solution than in this day and age when technical schools are increasing in numbers and the demand for skilled labor is being vigorously set forth by practical men in the business world."

Referring to expressed opinions about manual arts:

"Our problem, therefore, is not to accept any general statement about the virtues or defects of manual arts, but to study their mental relations."

Referring to the value of scientific method applied to manual arts:

"The greatest problem of modern society is to take the results of science into industry and refine the industrial arts under the guidance of theory."

Referring to work of analyzing industrial practices:

"The efficiency expert finds that by a careful analysis of some of these mediocre and clumsy forms of activity he can produce a more efficient form of behavior. He brings into the commercial world an entirely new psychological attitude."

Referring to the general problem of evaluating theory and practice in industrial work:

"A solution of the problem can be reached only thru further analysis of related subjects."

The above discussion indicates only *one* direction in which the principles of scientific organization may be applied to the manual and industrial arts, viz: That of organizing effort spent in *individual* performance so that it will stand the present day efficiency tests, which are being applied to all educational means.

There is another avenue in which scientific organization may be applied to manual and industrial arts and that is in organizing our departments as an institution so that *collective* performance may be most effective and prove itself so when tested by modern scientific methods. Whether our departments are large or small they may be organized on the basis of *functions*, the one underlying the organization of a business institution. For example, no self respecting or respected business organization is run on a losing financial basis. It must pay dividends or it must fail. In this day and age if business is not paying financially a doctor is called in to make a diagnosis. Immediately he determines *functions*. He is the scientific management expert. One of his first prescriptions is: Divide your business into *functioning* parts and systematize each part so that there shall be a responsible head to each part and so that everyone working in or for that part, shall have particular duties which he shall perform at stated times and in a definite way. Does this have anything to do in the field of manual and industrial arts with such things as:

1. A time for reconstructing courses of study?
2. A time for making a budget?
3. A time for requisitioning material?
4. A method by which the consumption of stock is recorded?
5. A method of organizing a demonstration and giving individual instruction.
6. A method of automatically keeping a daily check on attendance, equipment, etc.?

And does it have anything to do with such "little things" as oiling machines and shafting, cleaning up the shop, grinding tools, surfacing bench tops, testing drafting instruments, preparing stock for a particular job, returning projects from home, or a thousand and one other items of real importance which often are given little thought and almost never any consideration with reference to a "scheme?"

It is said that every business may be divided into functioning parts as follows:

1. Accounting, the part which makes evaluations and determines costs.
2. Purchasing, the part which secures all raw materials, equipment, etc., physical as well as personal.
3. Storage, the part which systematically cares for all goods, finished and unfinished.
4. Execution, the part which determines methods of operation.
5. Individual efficiencies, that part that studies individual performances and standardizes them.

In like manner a department of manual arts may be divided into *functioning parts*. These may not be the same as those for a business but in general they will be similar. Each functioning part may be controlled by a different individual as in the case of a department in a large city or the same individual may be in control of each and all functioning parts as in the case of a

department in a small city or town. The principle involved is the same in either case, viz.: *The several distinct operations or sets of operations in the institution should be segregated with respect to their particular functions.* The intrinsic function then of particular operations must be understood by the teacher of manual arts in a one-teacher department as well as by the teacher in a ten or twenty-individual department. The man in a small department who must do the same kind of work as that of several individuals in a large department, each one of whom is in control of but one operation or set of operations as indicated in the five functioning parts of business organization above listed, needs to conserve his energy by organizing his effort even more than does his colleague in the large department. Witness the chaos of a small one-man business as it is growing beyond its bounds unless the individual in charge has it organized in such a way that as it grows and others are employed to help, they can take charge of some functioning part and thus relieve the first individual.

The individual in charge of a small business or a small department of manual and industrial arts in which there are many functioning parts must, in his round of duties, *take advantage* of the principles of scientific management as given in the two following definitions. The first applies particularly to the individual performance and the second to the collective or institutional performance.

1. "Scientific organization is the setting of a task and the fixing of a reward after the task is analyzed and reduced to a science."

2. "Scientific organization is the correlating of the natural inter-dependent parts of an integral whole upon the basis of thoro co-operation."

The first of these definitions imposes the following conditions:

1. That the task shall be analyzed and reduced to a science.
2. That the task to be imposed shall be determined.
3. That for this task there shall be a reward.

The second definition imposes the following conditions:

1. The finding of interdependent parts. This means the analysis of the whole corresponding to the analysis of the task in the first definition.
2. The correlating of these parts. This means the determination of the new task or revised task spoken of in the first definition.
3. That the spirit of co-operation shall pervade the whole or the parts correlated. This means that rewards shall be fixed for whomsoever may be concerned.

It is evident that the meaning of the two definitions is the same. This is as it should be.

The principles of scientific management applied to the teaching of manual and industrial arts means that *we must analyze courses of study, individual performances and departmental organizations so that we can most thoroly economize individual effort and guard against overlapping of duties and responsibilities where collective effort is concerned.* We must foresee the purpose or function of our means in terms of the result or end of our work that no single plan will be made effective until as the result of analysis, it is tested and properly related to other plans.

We are told that a habit is formed by permitting no exception in a performance. A close analogy is found in a scientific organization in that no effort is expended which does not have an individual part to play in the cumulative result of expending all effort interdependently and co-operatively.

In applying the principles of scientific management and psychological analysis to individual pupil performances in manual and industrial arts, one would take steps about as follows and in the order given:

1. Study numerous normal performances. Example: Squaring around a board with a knife and try-square.
2. Analyze and reduce these performances to a workable minimum. Example: Determine the least number of individual operations in the performance and the natural sequence of operations.
3. Test the performances by having them practiced by an average workman. Example: Select an average student in the class and watch him square about a board as determined by step two.
4. Systematize and refine the minimum performance to establish a *norm.* Example: Change the method of squaring about a board as the result of observing an average student apply the performance determined in step two.
5. Apply the norm of performances universally under working conditions. Example: Have all the members of the class or similar classes use the method of squaring about a board determined upon in step four.
6. Secure a mutual understanding of the benefits to be derived in the reorganized performance. Example: By demonstration and explanation, show classes why the determined performance is the best from the standpoint of their expenditure of effort, time spent in the performance and the results secured. *In other words, make applications.*
7. Secure a hearty co-operation by fixing a just reward for all concerned. Example: Demonstrate to the class the value of forming a good habit in squaring about a board to economize time and effort, and to produce economic results when the performance is used for pay under industrial conditions. *In other words, make generalizations.*

The steps given above can be applied to the scientific organization of a department as an institution. This application demands the organization of a department into functioning parts. Only *one* illustration will be given here and that under "Execution," item number 4 in the list of functioning parts given above.

1. Analyze the work of a department upon the basis of its purpose or operation elements. Example: All courses involving free hand drawing and design to any great extent would appear as a group demanding special study.
2. Group work of a common purpose and minimize performances in it. Example: Put the design for several kinds of shop work into one course or under the supervision of one individual.
3. Operate the department upon the reorganized

basis of functioning parts. Example: Allow the teacher of drawing and design to outline the design work in shop courses.

4. Expand this test operation to actual working conditions for the whole department. Example: See if the mechanical drawing course may not be made to include shop drawings needed in different shop courses. In other words, put the mechanical drawing of shop courses into the regular course in mechanical drawing.

Note—Securing mutual understanding and hearty co-operation by fixing a reward as indicated in six and seven in the first set of steps does not need development here.

Such an organization of work on the basis of its function will result in classifying courses into general groups and correlating work which has a common purpose. Examples:

1. Freehand design will be analyzed as an integral and inseparable part of craft work.

2. Mechanical drawing will appear as a means in shop construction and, therefore, will be taught in correlation with shopwork.

3. The place of manual arts as a means in the study of the physical sciences will be shown.

4. The application of manual arts in industrial life will be made clear.

In short the department of manual and industrial arts will justify its existence, if indeed it has such a justification, in terms of educational significance.

The results of some of our recent educational surveys indicate that manual and industrial arts in public education must be prepared to explain why they are taught as they are, what their general educational and industrial value is, and why the public should be called upon to pay for the equipment which they demand. Incidentally, and in this connection, it may be said that when we know more about the real purpose of the manual and industrial arts we shall know better how to plan a budget for supplies and equipments which was discussed in the last two articles of this series.

Some of the studies which the manual and industrial arts teachers of this country might well make in which they would apply psychological analysis and the principles of scientific management are the following:

1. The organization of a department upon the basis of functioning parts. The classification of the executive and administrative duties of the individual in charge of each of these parts whether there be one or more individuals in the department.

2. The organization of the business of a department so that there may be a unified system of reports, records, requisitions, etc. A plan by which the individual in charge of one part of the department will confer with the others to make plans for administering and executing the affairs of the department without a duplication of effort. In case there is but one individual in the department, he will organize his efforts by this means upon the basis of scientific analysis of his several duties.

3. The systematic arrangement of all supplies and equipments in the department to be easily secured, recorded and checked.

4. The organization of all courses of study upon the basis of the best mechanical practice and in accord with the best pedagogical principles. This will demand a study of educational values thru individual performances and an analysis of trade operations and requirements.

5. A careful record and reorganization of individual performances under the guidance of those who are familiar with the methods of experimental psychology.

6. A careful survey of the industries and trades in co-operation with educational survey experts to determine the best individual and collective performances in manual and industrial arts that they may function *specifically*. This study indicates one of the present pressing needs in the evolution which is going on in the adjustment of manual arts for vocational ends so that in the adjustment, both educational and industrial values may be duly emphasized.

7. The co-operation with others who are seeking to work out a plan of practical vocational guidance. Possibly no department in the school system has a greater opportunity than the department of manual arts to contribute substantially on the side of industrial practice to the guidance of school children for the purpose of discovering vocational aptitudes.

It may be that this paper will be regarded as theoretical—that it finds its application in the college or university or in the department of manual and industrial arts in a large city. The belief of the writer is that while the more detailed psychological studies must be outlined by our experimental psychologists and the details of institutional organization must be indicated by the students of scientific management, that the rank and file of manual and industrial arts teachers are the individuals who must make up the great body of students and workers in the problems which have been outlined. These teachers are the ones who have most at stake. The future of their work depends upon scientific evaluation in terms of educational and industrial standards. While scientific analysis and organization may have some unessential features, it possesses real merit and has direct application to any field of human effort. Its principles may be applied to make the manual and industrial arts more nearly fill their place as a means in education which may be justified by reasonable scientific tests.

The great test, however, of manual and industrial arts, or of any other organization, scientific or otherwise, centers in what might be termed the "selling" function corresponding to the sales end of a business organization. "The test of the pudding is in the eating." We need to determine a goal or goals for manual and industrial arts. If the majority of those who go out from under our fostering care as teachers do not reach that goal all individual performance, collective performance, functions, etc., for which we may arrange with great care and precision count for little. However, let not the measure of this goal be fixed by the standards of industry alone. May we still have faith in that intangible thing called culture and may we justify our subjects and the methods of giving them on this ground as upon others by some reasonable scientific test!

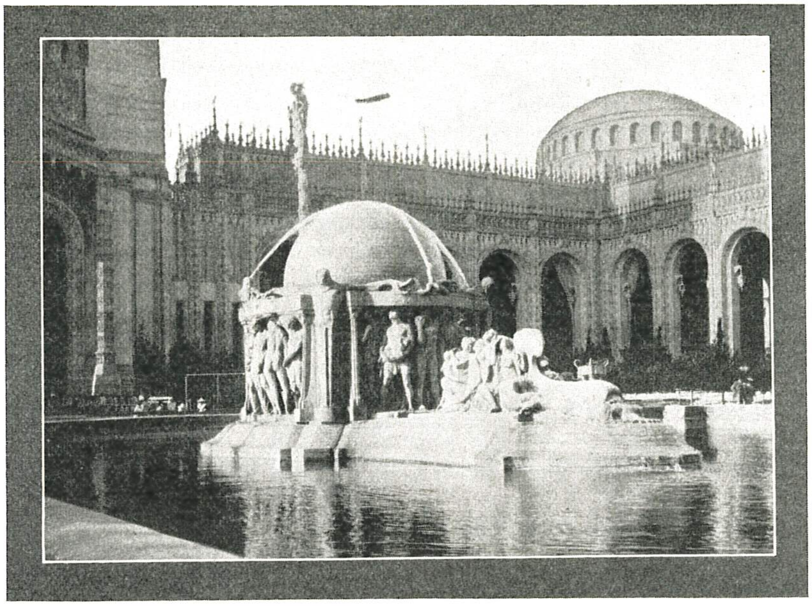


Plate I. Fountain of the Earth.

THE 1915 EXPOSITION

Royal B. Farnum, State Specialist in Art Education, Albany, N. Y.

THE Panama-Pacific International Exposition is so rich in design that the teacher is puzzled to know where to begin and where to leave off. My own experiences are, I judge, typical of others. I made an early decision and wilfully neglected the inside shows with but three exceptions, the Liberal Arts, the Fine Arts and the Education Palaces.

I have already given a few of my impressions in this magazine, hinting at the sculpture and landscape design. The colossal sculptured figures cannot escape notice and the wonderful gardens and trees are constantly apparent. But I found many minor details which, like the subordinate attractions of a picture or the secondary masses in a decoration, serve not only to enhance the big exposition scheme but are choice bits in themselves.

In the first place, and in direct relation to the bigger things, subsidiary elements were apparently most carefully considered. Plate 1 illustrates the great Fountain of the Earth. This group of figures alone would be magnificent anywhere but an added element is to be found in the quiet water which always concentrates attention by producing shifting ripples and reflections. Here a principle of landscape design is made to enrich sculpture. But moving water with its gurgle and splash produces a much more forceful accent, and as it rushed over the surface of the huge sphere it actually compelled one to continually look at the fountain to the exclusion of everything else. Moreover the waters washing the great earth by day and the colored steam enshrouding it by night gave a hint of mysticism most enchanting.

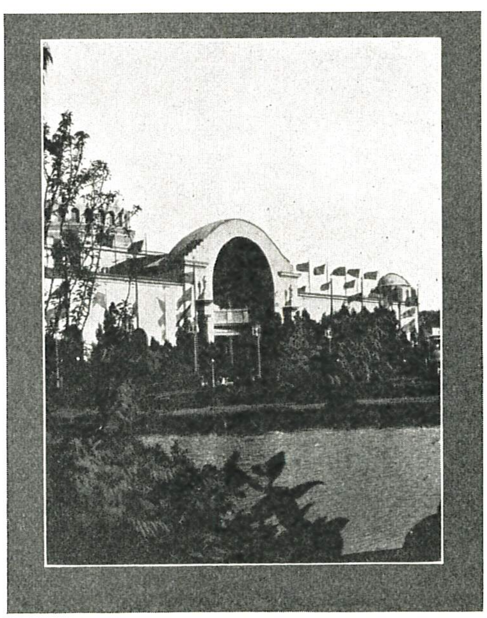


Plate II. Facade of the Palace of Education.

Plate 2 illustrates again the importance of secondary points in relation to the main features of interest. The Education Palace, richly decorated under the domes and at the entrances, is simply, almost barrenly treated on the facade which faces the Fine Arts Palace and Lagoon, so it does not detract from a unit of major importance; yet with flat, evenly tinted walls, even tho relieved somewhat by the masses of trees in front, it lacked spirit and life. The problem was to gain some sort of action without detracting from the finer Palace across the water. Only one thing would do it and so the small, gay-colored banners were flung merrily, yet humbly, to the breezes which sweep directly from the Pacific.

A task by no means easy in any exposition is to dispose of separate, unrelated exhibits of sculpture, objects intended for no particular setting. Plates 3, 4 and 5 show an unusually successful treatment of the problem. The Bird Fountain, in number 3, is in a small open spot of green terminating the end of the Fine Arts colonnade. There it stands, a sen-

tinel gleaming white in the sun, the chubby little figure clutching to his breast a frightened bird, and the living, noisy sparrows drinking and splashing all around him.

Contrast number 4 with this and note the difference in the problems presented.* Here no less delightful figures are set between the great towering columns and are encircled with cool, green foliage. They become little accenting notes, comas and semicolons in the well-phrased sentence, and are even more charming by contrast with the massive architecture. Each figure seems to be intentionally placed with deliberate regard for its surroundings. Passing from one to another (for there are as many as there are spaces between columns) the

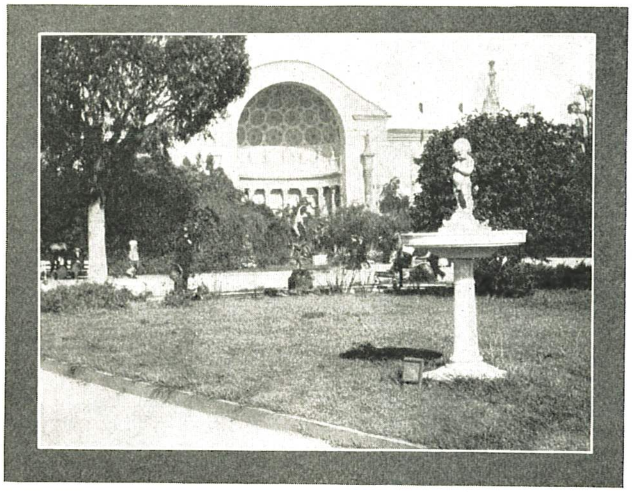


Plate III. Bird Fountain.

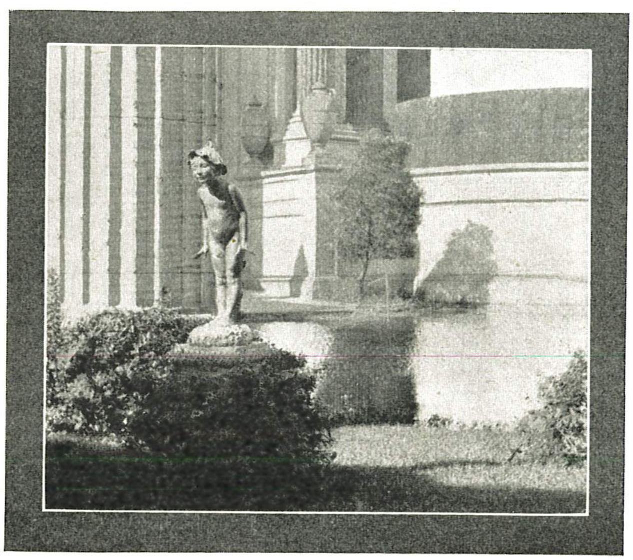


Plate V. The Flower Girl.

Flower Girl is reached, just as the rotunda of the Fine Arts Palace looms up. But here, Plate 5, less foliage and more vista, less restriction and more freedom are given.

The master designers knew well that if the statues were left detached and the buildings were left bare there

*No. 3, with its tinkle of water and splashing of birds, needs no added attractions, while the small bronze figures in the next plate require quite a different setting.

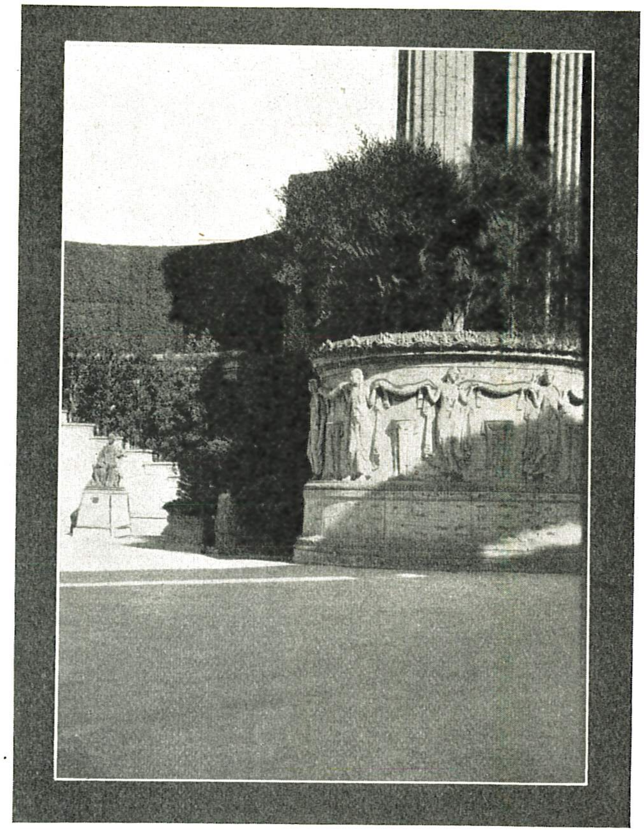


Plate VI. High Reliefs and Setting of Foliage.

would be a decided lack of harmony. Consequently decorative details were necessary. Foliage has been used extensively. Naturalistic treatment abounds and it is almost incredible that vegetation is of but recent growth; in fact, quite recent for after the first planting it was discovered that the pile driven floor did not keep out the salt sea water and the whole area had to be relaid. The gardening softens corners and screens crevices and joints but additional elements for the exposition were needed to produce complete harmony. These will be discovered in Plates 6 and 7, reliefs both high and low, and architectural decorations.

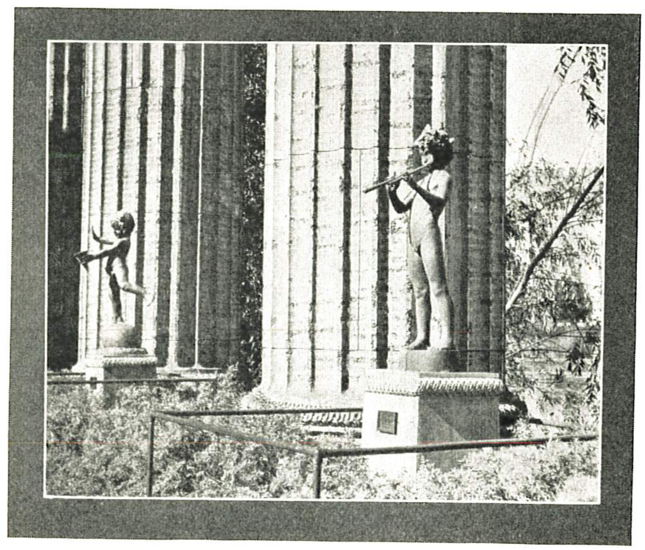


Plate IV. Pan—By Janet Scudder.

The reliefs offer smooth and restful transition from sculpture to building, from projection and depth of shadow to wall surface and flat decoration. It is a suggestion of the diminuendo of song with the theme of air always before you.

The wonderful urns in Plate 7 are the high lights to the picture. They appeal not only because of their fascinating shapes but because they arouse your curiosity as to the number and size of genii that may be bottled up within. They throw wierd shapes and shadows, they multiply constantly their clear reflections in the waters of the lagoon, they glow in the searchlights at night, and they stand always as sentinels guarding the treasures of the palace.

Thus to one whose eyes are open the Exposition is a mine rich with the arts and the crafts. The architect, the sculptor, the painter, the decorator, the craftsman, and the landscape artist are all represented in a harmonious relationship worthy of the country and the century.

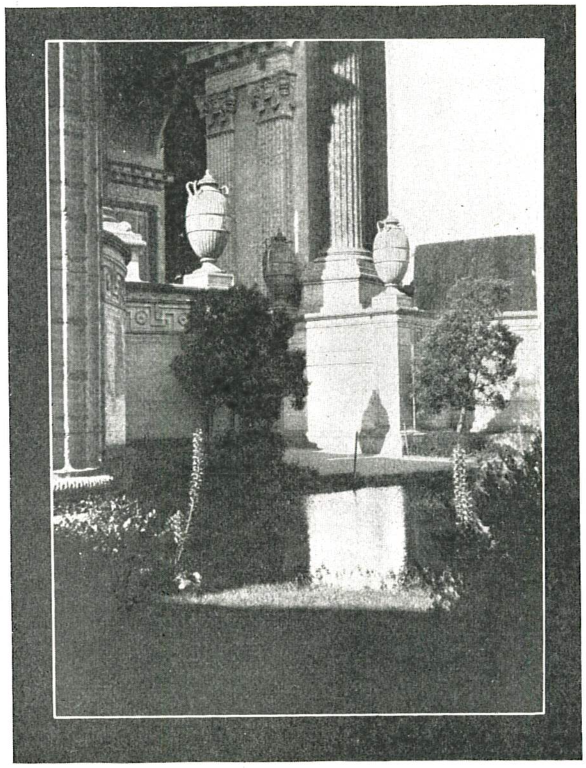


Plate VII. Urns Before the Palace of Fine Arts.

INDUSTRIAL ARTS DESIGN

Wm. H. Varnum, University of Wisconsin

(Twelfth Article)

REFERRING to Article Eleven, we found clay to be a free and plastic material adapted to a wide range of surface enrichment processes. Metal as a more refractory material offers greater resistance to the craftsman and is relatively more limited in its capacity for surface decoration. As was the case in the consideration of contour enrichment for designing purposes, it is necessary to divide metal into two groups, precious and base metals, before proceeding to consider the surface enrichment. As the field of design in both base and precious metals is large, it is advisable to consider the surface enrichment of *precious metals only* in this article.

Following an order similar in character to that used in clay designing, problems in both base and precious metal may be divided into four classified groups as follows: Flat, square, rectangular or irregular planes; shallow cylindrical forms; low cylindrical forms; high cylindrical forms. Designs included in the first group, flat planes, comprise such problems as are typically represented by tie pins, fobs, rings and pendants. The design problems presented by these examples are so important that it is again wise to restrict this article to *flat planes.*

Inceptive Axes and Points of Concentration.

The semi-precious or precious stone is commonly found to be the point of concentration of these designs. The inceptive axes of tie pins, pendants and fobs are generally vertical center lines because of the vertical positions of the objects when worn. The inceptive axes, moreover, should pass thru the point of concentration and, at the same time, be sympathetically related to the structure. Rings and bar pins are frequently designed with horizontal inceptive axes, so determined by their horizontal characteristics and positions.

The point of concentration for tie pins, pendants and fobs in formal balance, in addition to coinciding with the inceptive axis, is generally located above or below the geometric center of the primary mass. The point of concentration for rings and bar pins is placed in the horizontal inceptive axis and centrally located from left to right.

As a step preliminary to designing, and in order that the enrichment may be conventionalized or adapted to conform to the requirements of tools, processes and materials, it is now imperative to become familiar with a number of common forms of surface enrichment in metal. There are eight processes frequently encountered in the decoration of silver and gold; piercing, etching, chasing or repoussé, enamelling, inlaying, stone setting, building, carving. To these may be added planishing, frosting or matting and oxidizing as methods employed to enrich the entire surface. As economy of material is of prime importance in the designing of precious metal, and, particularly in gold projects, conservation of the metals should be an urgent consideration in all designs.

A non-technical and brief description of each process follows. All designs in this article may be identified by referring to the process numbers after the figure description as 1-3-5; 2-4-6, corresponding to the key numbers on Plate 45. A design to be submitted to the craftsman should be a graphic *record of technical facts* in addition to good design, which requires that we should have an expressive *technical manner of rendering each process.* The last column, on Plate 45, indicates this rendering. In addition to this rendering each one of the eight technical processes has been carried thru three design steps as follows: (1—first column), planning the original primary mass, with its inceptive axis suggested by the structure and intended use, passing thru the point of concentration; (2—second column), the division of the primary mass into zones of service and enrichment with the suggestion of the leading lines which, at some points, are parallel to the contours and lead up to the point of concentration. The contours in this column have, in several instances been changed to add lightness and variety to the problem. The last step; (3—column three), shows the design with graphic rendering suggestive of the completed process.

Technical Processes and Methods of Illustrating Same in a Design. Plate 45.

1. *Piercing.* Removal of design unit or background by means of the jeweller's saw. Bridges of metal should be left to firmly support all portions of the design. Test this by careful study of the design. Rendering—shade all pierced portions of the design in solid black. Slightly tint portions of the design passing *under* other parts (Illustration, Figure 336).

2. *Etching.* Coating either design or background with an acid resistant, to be followed by immersion of the article in an acid bath, allowing the unprotected portion to be attacked and eaten by the acid to a slight depth. Rendering—slightly tint all depressed or etched parts of the design (Illustration, Figure 339).

3. *Chasing or Repoussé.* The embossing and fine embellishment of a metal surface by the application of the hammer and punches. The work is conducted mainly from the top surface. Rendering—stipple all parts of the background not raised by the process. Chasing should seem an integral part of the background and not appear stuck upon it (Illustration, Figure 342).

4. *Enamelling (champleve).* A process of enamelling over metal in which the ground is cut away into a series of shallow troughs into which the enamel is melted. Exercise reserve in the use of enamel. Over-decoration tends to cheapen this valuable form of decoration. Rendering—shade the lower and right-hand sides of all enameled areas to suggest relief (Illustration, Figure 345). (If possible render in tempera color.)

5. *Inlaying.* The process of applying wire, etc., to an incision on metal either by burnishing or fusing the metal into the cavities. Rendering—tint the darker metal or, if possible, render in color (Illustration, Figure 348).

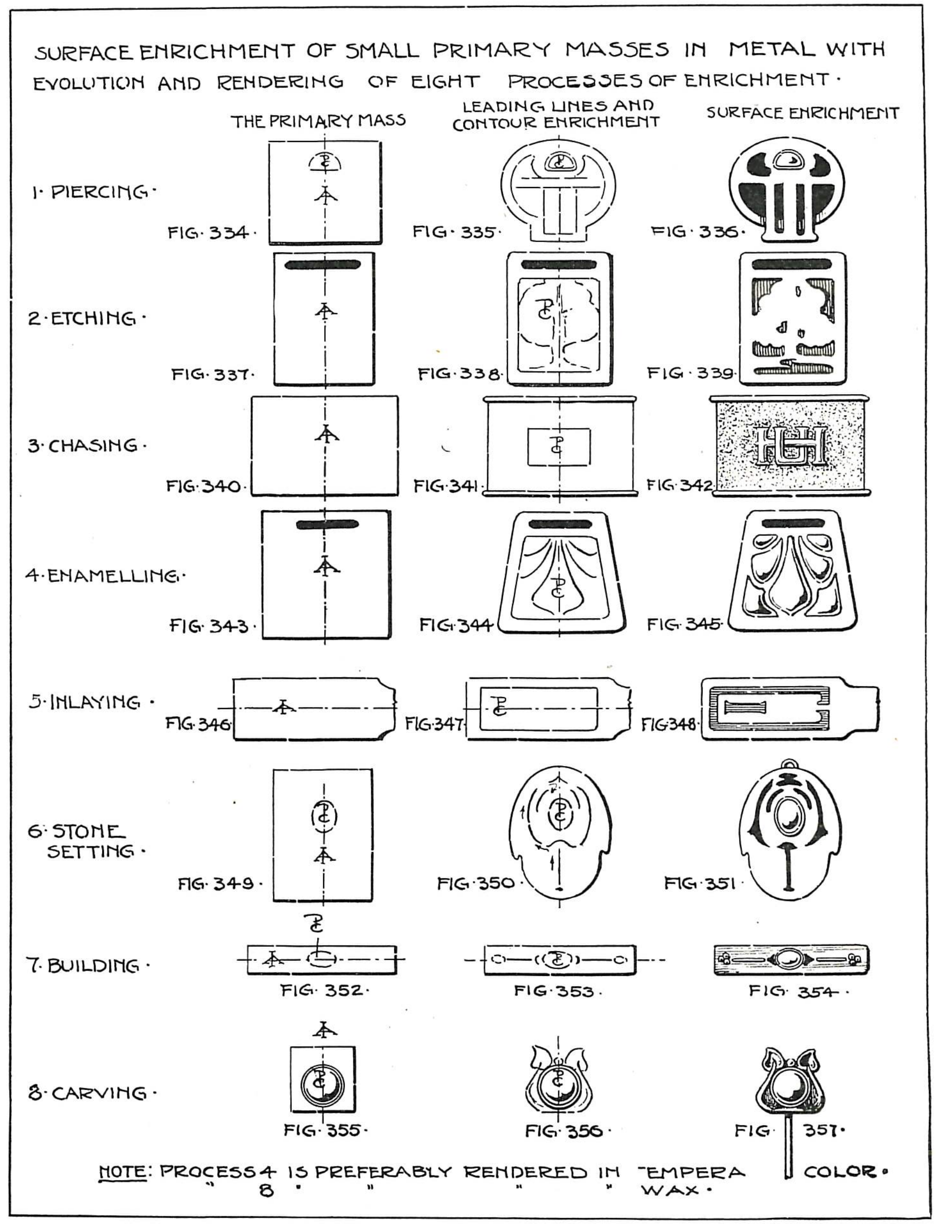


Plate 45.

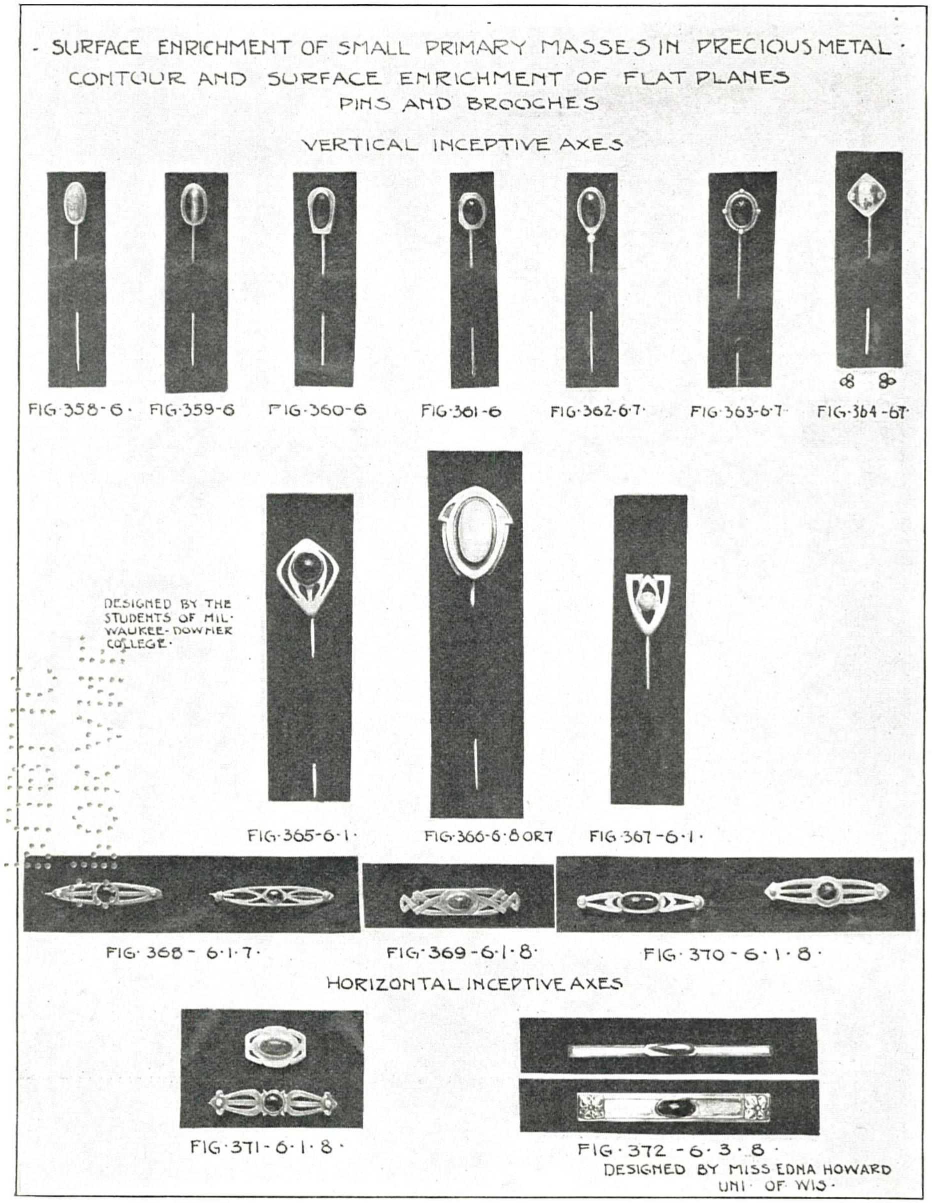


Plate 46.

6. *Stone Setting.* An enrichment of the surface by the addition of semi-precious or precious stones. Other enrichment is generally subordinated to the stone which then becomes the point of concentration. All enrichment should lead towards the stone. Small stones may, however, be used to accentuate other points of concentration in surface enrichment. Rendering—shade the lower and right-side of the stone to suggest relief. Pierced subordinate enrichment should be shaded in solid black. A concentric line should be drawn outside of the contour of the stone to designate the thin holding band or bezel, enclosing the stone on all sides (Illustration, Figure 354).

7. *Building.* The process of applying leaves, wire, grains and other forms of surface enrichment to the plane of the metal. These may afterwards be carved or chased. Rendering—shade the lower and right-hand lines; slightly tint the lower planes of the metal (Illustration, Figure 354).

8. *Carving.* The process of depressing or raising certain portions of the metal surface by means of chisels and gravers. By these tools, the surface is modelled into planes of light and shade, to which interest is added if the unaggressive tool marks are permitted to remain on the surface. Rendering—shading the raised and depressed portions to express the modeling planes. As this is a difficult technical rendering, the designer is advised to model the design in plastelene or jewellers' wax (Illustration, Figure 357).

9. *Planishing.* The process of smoothing and, at the same time, hardening the surface of the metal with a steel planishing hammer. The hammer strokes give an interesting texture to the surface which may be varied, from the heavily indented to the smooth surface, at the will of the craftsman. The more obvious hammer strokes are not to be desired as they bring a tool process into too much prominence for good taste. Rendering—note appended to the drawing.

10. *Frosting.* A process of sand blasting or scratch brushing a metal surface to produce an opaque or "satin" finish. Rendering—similar to Planishing.

The eleven processes mentioned above are among those which by recent common practice have become familiar to the craftsman of precious metals. While they do not cover the entire field, they at least will give the beginner an opportunity to intelligently design in terms of the material.

Design of Pins and Brooches.

Plate 46 is mainly the enrichment of the flat plane by the addition of semi-precious stones, (process six). Whatever surface enrichment is added to this, design becomes *dependent* enrichment and quite analogous to *dependent* contour enrichment, inasmuch as it has to be designed with special reference to the shape and character of the stone. Figures 358 to 363 are examples of *dependent contour* enrichment; Figures 364 to 371 are *dependent surface* enrichment. Figures 358 to 367 are based upon *vertical* inceptive axes as appropriate to their intended service, and the point of concentration may be located at practically any point on this inceptive axis, provided the major axis of the stone coincides with the inceptive axis. The best results are obtained by placing the stone a little above or below the exact geometrical center of the primary mass.

Figures 368 to 372 are articles based upon a horizontal inceptive axis. The stone, in accordance with formal balance, is in the geometric center from left to right. One notices the important fact that the surface enrichment must bring the stone and contour together with sympathetic relation and, at the same time, be related to both stone and contour, again bringing out the meaning of *dependent* surface enrichment. The contour enrichment is to be kept as simple as possible and the interest concentrated upon the surface enrichment. The accentuation of both surface and contour enrichment in one design marks the height of bad taste in design.

Fobs.

Plate 47 shows flat planes with service determined vertical inceptive axes, suggested by the long vertical lines of the fob ribbon. Figure 380 is noted as an exception to this vertical inceptive axis as it possesses a vertical primary mass but with radial inceptive axes. The interesting manner by which the dynamic leaves of the outer border transmit their movement to the inner border which in turn leads towards the point of concentration, is worthy of attention. The points of concentration in other designs on this plate are all contained in the vertical inceptive axes.

Rings.

Plate 48, at first thought, would seem to fall under the classification of low cylindrical forms but when reference is made to Figure 385, it is readily seen that the ring has to be first developed as a flat plane, to be afterwards bent into the required form. Care should be taken to keep the design narrow enough to be visible when the ring is in position on the finger.

The long horizontal band of the ring supplies the motive for the horizontal inceptive axis as a common basis or starting point for a large number of designs. If the designer so desires, the vertical axis of the finger is authority for an elliptical stone to be placed with its major axis as a vertical line in harmony with the finger axis. In any instance it becomes a question of smoothly translating the attention or of leading the eye from the horizontal portion of the ring (the finger band) towards the point of concentration (the stone), by means of surface enrichment. A long sloping contour curve helps as a translating line in the boundary, from the stone to the finger band, while a great number of devices are used to complete a similar translation in the surface enrichment. Too much piercing, weakening the structure, is to be avoided, as a dangerous expedient.

Pendants and Chains.

Plate 49 suggests some vertical flat planes for pendants. While no definite rule can be stated, from past customs, it is easier for beginners to place the stone on the vertical inceptive slightly above the geometric center of the primary mass (Figures 391 to 395). A design thus formed is less liable to appear heavy altho there is nothing arbitrary about the suggestion.

In pendant design the surface enrichment generally translates the attention from the contour of the pendant to the stone, thus insuring unity at this point, while the

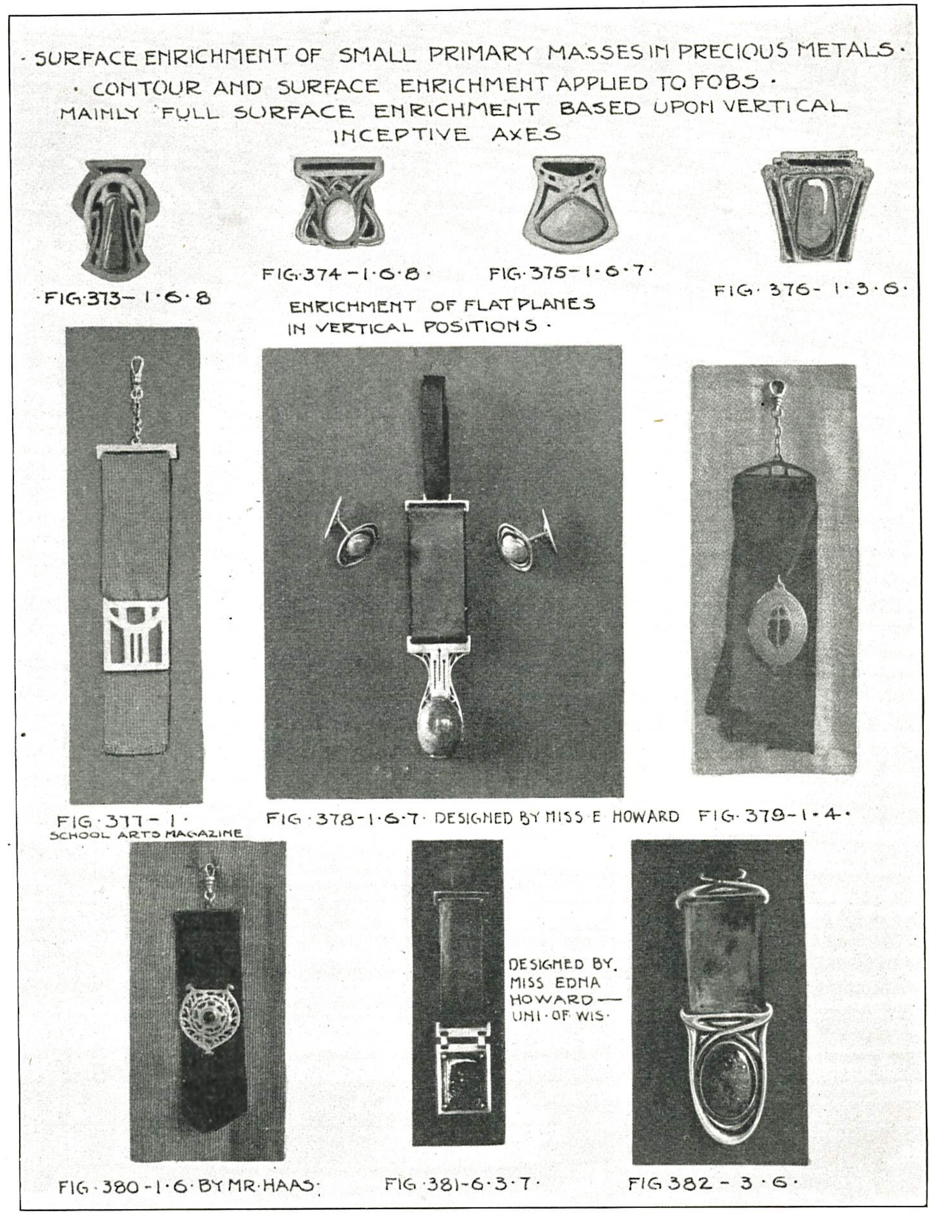


Plate 47.

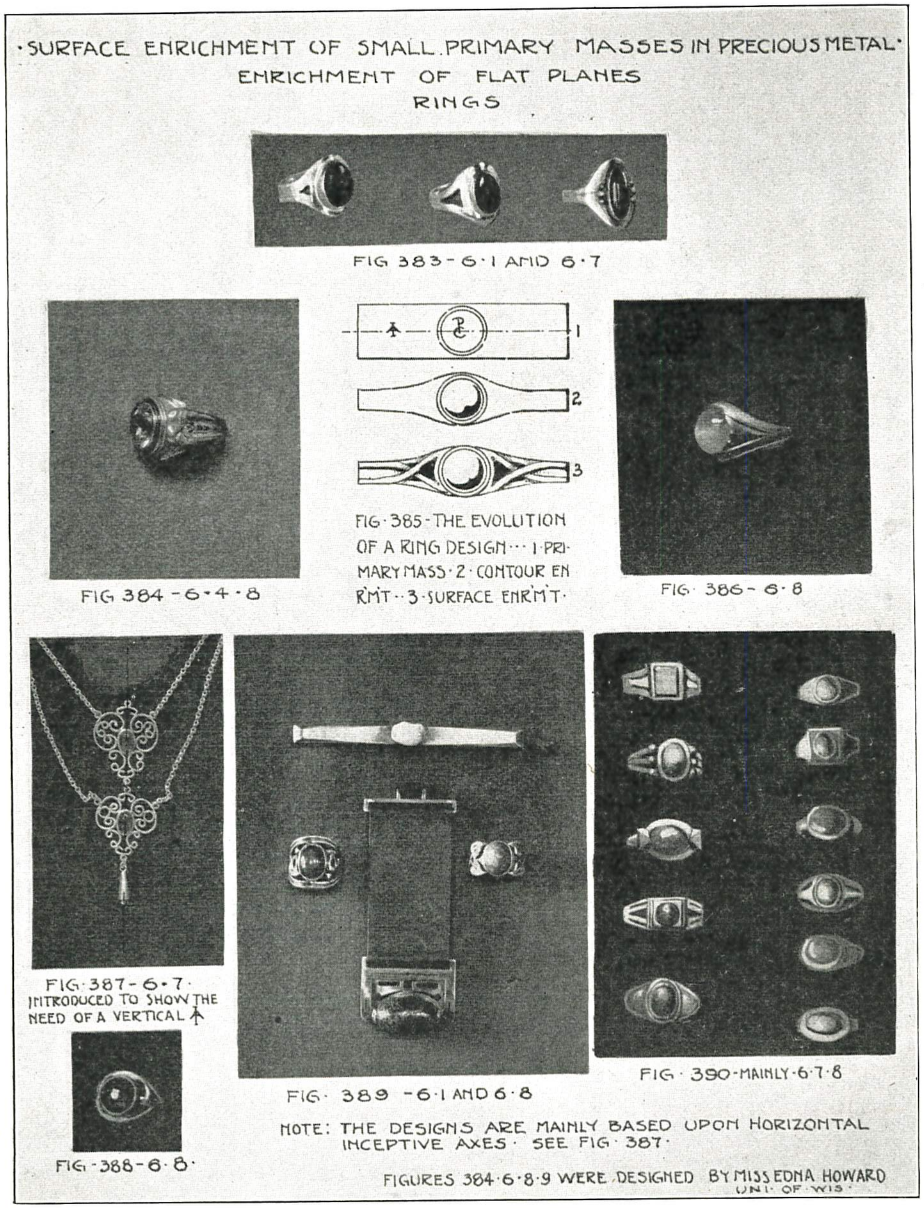


Plate 48.

contour lines often translate the pendant to the chain. The eye should move in unbroken dynamic movement from pendant to chain. The chain may have points of accent designed to vary the even distribution of the links. These accents are frequently composed of small stones with surface enrichment sympathetically designed in unity with pendant, chain and stone. Figure 401 shows examples of this arrangement and similarly the need of a horizontal inceptive axis to harmonize with the length of the chain. These small accents are quite similar in design to bar pin motives.

Relation of Stones to Metal.

For the designer's purposes we may consider two kinds of stones, the transparent and the opaque. These should not be mixed in one design. The most favorable stones are those forming contrasts of value or brilliancy with the metal as, for example, the amethyst, lapislazuli or New Zealand jade with silver, or the dark topaz or New Zealand jade with gold. Lack of these contrasts gives dull, monotonous effects that fail to make the stone the point of concentration. These effects may be partially overcome by frosting, plating or oxidizing the metal, forming stronger contrasts of value.

Rules for Surface Enrichment of Base and Precious Metal. Flat Planes.

Postulate—The design should conform to the limitations and requirements of tools, processes and materials, and should be durable and suitable for service.

10a. *Designs in precious metals should call for the minimum amount of metal necessary to express the idea of the designer for two reasons—1, good taste; 2, economy of material.*

10b. *Contour and surface enrichment should never appear to compete for attention in the same design.*

10c. *Parts of a design differing in function should*

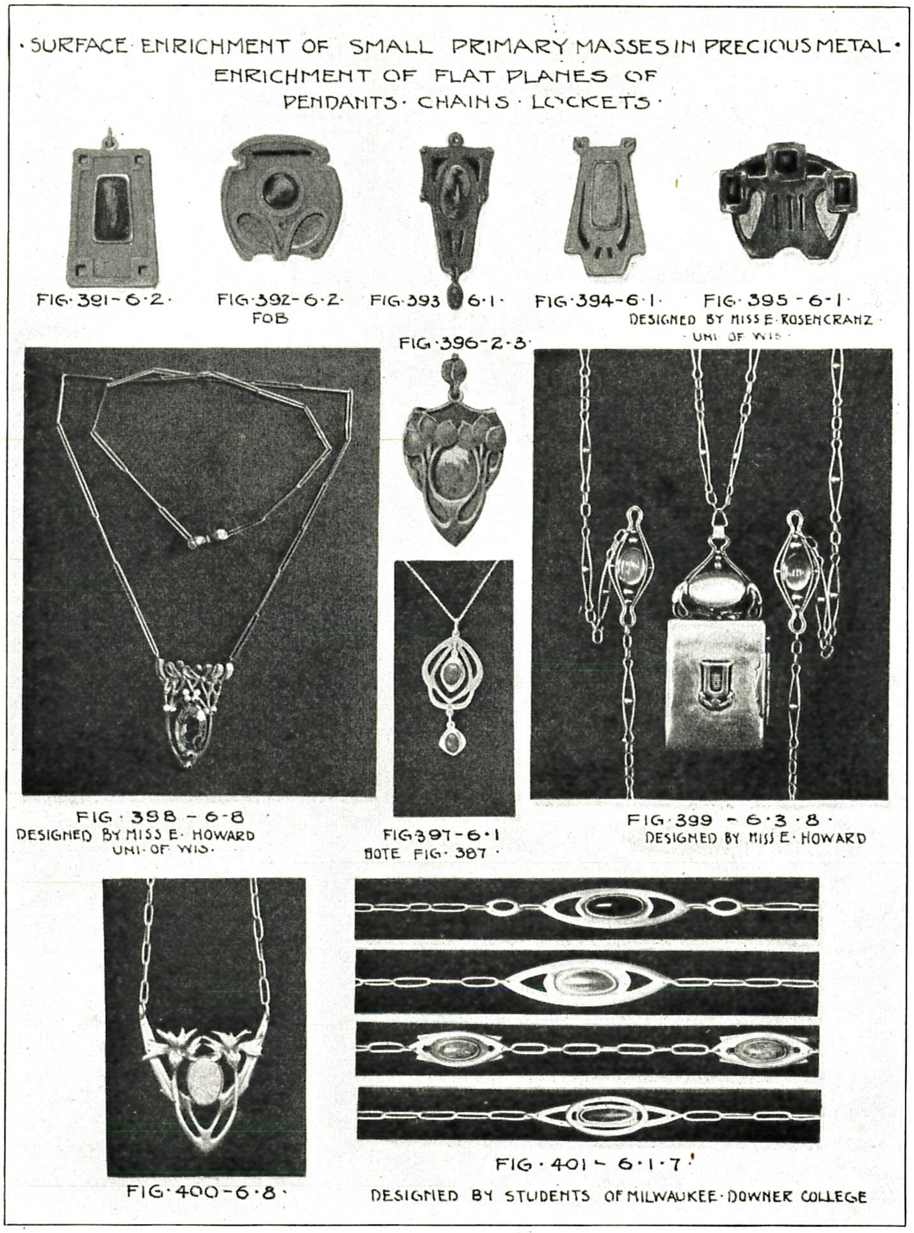


Plate 49.

differ in appearance but be co-ordinated with the entire design.

10d. *Surface enrichment should at some point parallel the contours of both primary mass and point of concentration especially whenever the latter is a stone or enamel.*

10e. *In the presence of either stone or enamel as a point of concentration, surface enrichment should be regarded as an unobtrusive setting, or background.*

10f. *Stone or enamel used as a point of concentration should form contrast with the metal, of either in color, brilliancy or value or all three combined.*

10g. *The inceptive axis should pass thru and coincide with one axis of a stone and at the same time be sympathetically related to the structure.*

10h. *The position of the inceptive axis should be determined by (1) use of the project as ring, pendant bar pin, (2) character of the primary mass as either vertical or horizontal in proportion.*

10i. *Caution should be exercised with regard to the use of enamel. Overdecoration by this material tends to cheapen both process and design.*

10j. *All surface enrichment should have an appearance of compactness or unity. Pierced spots or areas should be especially guarded against the appearance of having been scattered on the surface without thought to their coherence.*

10k. *Built, carved and chased enrichment should have the higher planes near the point of concentration. It is well to have the stone as the highest point above the primary mass. When using this form of enrichment, the stone should never appear to rise abruptly from the primary mass but should be led up to by a series of rising planes.*

10l. *The lanes or margins between enameled spots should be narrower than the lane or margin between the enamel and the contour of the primary mass.*

10m. *Transparent and opaque stones or enamel should not be used in the same design.*

PROBLEMS IN FARM MECHANICS

Louis M. Roehl, Milwaukee County School of Agriculture

(Third Article)

WAGON JACK—A RURAL SCHOOL WOODWORKING PROBLEM.

Material Required.

Lumber:

1 piece oak, birch or maple 1"x6"x6'-6".

Hardware:

6 machine bolts 3/8"x3 1/2" with washers.
2 flat head, bright wood screws 1 1/2", No. 10.
2 pieces of iron 1/4"x1"x4".
3 iron rivets 1/4"x1 3/4".

Stock Bill.

Pieces	Finished Dimensions	Use
1	1"x3" x3'-0"	Top
1	1"x2 1/2"x3'-0"	Main Brace
2	1"x2 1/4"x12"	Front Standards
2	1"x1 1/8"x22"	Back Standards
1	1"x3" x24"	Lever
1	3/4"x2" x8"	Foot
1	7/8"x4" x4"	Wheel

Directions.

1. Reduce all pieces to finished dimensions.

2. Round one end of the top by swinging an arc on a centerline at one end with a radius of one and one-half inches, and remove stock with saw and chisel.

3. Lay out axle notches by drawing lines across the upper edge of the top two and three-quarters inches apart and another line on the side of the stock one inch from the top edge. Cut the notches with the rip and crosscut saws.

4. Round the ends of the front standards by swinging arcs on a centerline one and one-eighth inches from the end with a one and one-eighth inch radius.

5. Find the center of the piece for the wheel by drawing lines diagonally across the stock, and swing the circle with the compass set at a 2 inch radius.

6. Lay out the lower end of the main brace as shown in the detail drawing to fit the foot, and cut the upper end at a bevel.

7. Lay out and cut a one-quarter inch chamfer around the upper edge of the foot excepting where it fits into the main brace.

8. Swing a circle on a centerline drawn lengthwise of the lever, one and one-half inches from the upper end with the compass set at one and one-half inch radius; taper the lever to one and one-half inches at the lower end, and remove the stock to line. Lay out and cut a one-quarter inch chamfer at all four corners of the lever as shown in the drawing.

9. Fasten the foot to the main brace with two one and one-half inch No. 10 flat head, bright wood screws.

10. Bore holes with three-eighths inch bit for bolts at positions shown in the drawing and assemble parts with bolts.

11. Bore one-quarter inch holes for rivets of iron plate at center of circle of lever, as shown in the drawing at upper end, and fasten plates by riveting in position.

This carpenter's workbench was designed and built to fill the need of a bench in the Farm Shop. The hardware is such as may be obtained of any local hardware dealer.

It contains no glued joints and the making of it is entirely within the range of a country boy who has learned the more practical woodworking operations.

It is suggested that the making of the bench be one of the first home problems in woodwork to be done in co-operation with the manual training work in the rural schools.

CARPENTER'S WORKBENCH.

Material Required.

Lumber:

1 piece	2"x10"x10'-0"	maple
1 "	2"x 8"x 2'-8"	maple
2 "	2"x10"x10'-0"	select white pine
1 "	2"x 4"x16'-0"	select white pine
1 "	2"x 4"x 3'-0"	maple
1 "	2"x 6"x10'-0"	No. 1 white pine
3 "	1"x10"x10'-0"	No. 1 white pine
1 "	½"x 8"x12'-0"	No. 1 white pine
1 "	1"x10"x 2'-0"	maple

Hardware:

18 carriage bolts ⅜"x7" with washers
12 carriage bolts ⅜"x4¾" with washers
1 carriage bolt ⅜"x4¼" with washers
42 flat head, bright screws 2" No. 12
15 flat head, bright screws 1½" No. 10
1 16"—1⅛" bench screw
1 iron pin ½"x4½"

Stock Bill.

Pieces	Finished Dimensions	Use
1 maple	1¾"x10" x10'-0"	Top
2	1¾"x10" x10'-0"	Top
1 maple	1¾"x3¾"x 2'-8¼"	Leg
5	1¾"x3¾"x 2'-8¼"	Legs
3	1¾"x5¾"x 2'-2¾"	Cross rests
2	⅞"x9¾"x10'-0"	Side aprons
1	⅞"x8" x 2'-2¾"	Shelf
2	⅞"x1½"x 8"	Shelf rests
3	⅞"x3¾"x 2'-2¾"	Leg Braces
2	⅞"x3¾"x 4'-5⅞"	Braces
2	⅞"x2" x 1'-9½"	Cross shelf rests
1	⅞"x7" x 2'-0"	Drawer front
2	½"x7" x23¾"	Drawer sides
1	½"x6" x23"	Drawer back
2	½"x8" x23¾"	Drawer bottom
1	½"x7" x23¾"	Drawer bottom
2	⅞"x3" x 2'-2¾"	Drawer rests
1	1¾"x7¾"x 2'-7"	Vise
1	⅞"x5¾"x16"	Vise
1	⅞"x2¾"x16"	Vise lock
1	⅞"x3¾"x 6"	Bench stop

Directions.

1. Reduce all pieces to finished dimensions.

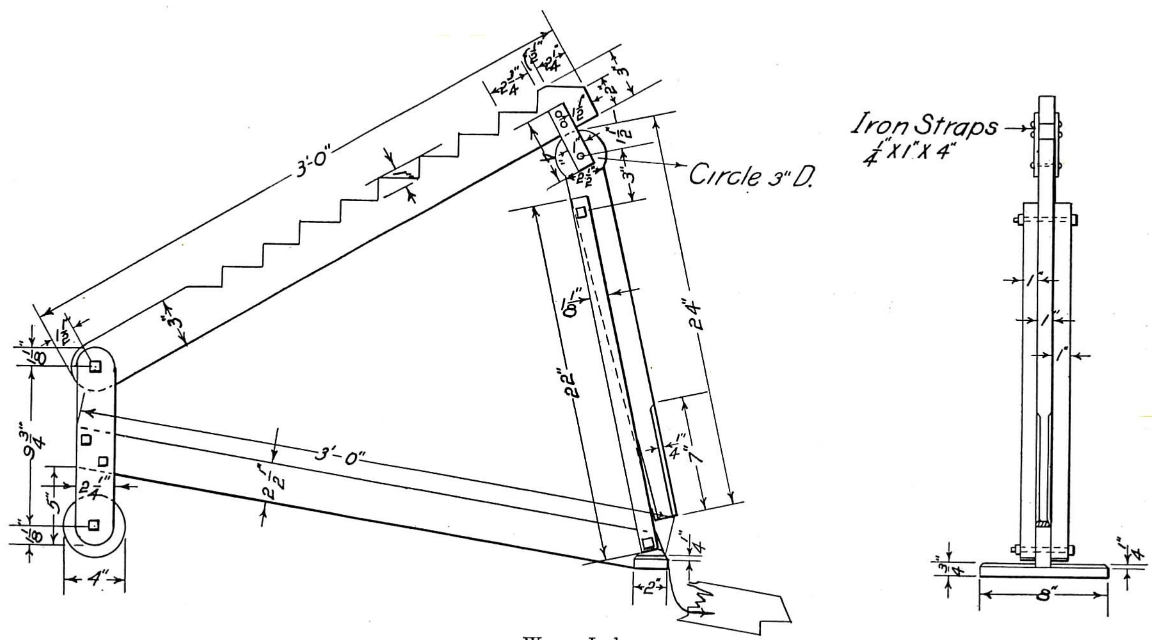
2. Lay out and cut notches 1"x5¾" on one edge at one end of each leg to receive the cross rests.

3. Lay out and cut out the dadoes ½"x3¾" on the legs for the leg braces, 6" from the lower end of each leg.

4. Lay out the vise to a 3¾" taper at the lower end and 6" at the upper end and remove the stock to line with saw and plane.

5. Lay out and cut a ¼" chamfer on one side of the vise at both ends and both edges.

6. Taper the front piece for the vise to 3¾" at each end.



Wagon Jack.

7. Chamfer the front piece the same as main piece for vise.

8. Bore ⅝" holes for ½" iron peg in the vise lock at points shown in section drawing.

9. Lay out and cut an opening at center of lower end of vise ⅞"x2¾" to receive the vise lock and fasten vise lock in place with a ⅜"x4¼" carriage bolt.

10. Lay out and cut a mortise in the maple leg; the mortise to be 15-16"x2 13-16" on a centerline, drawn lengthwise of the stock; the upper end of the mortise to be 6" from the lower end of the leg.

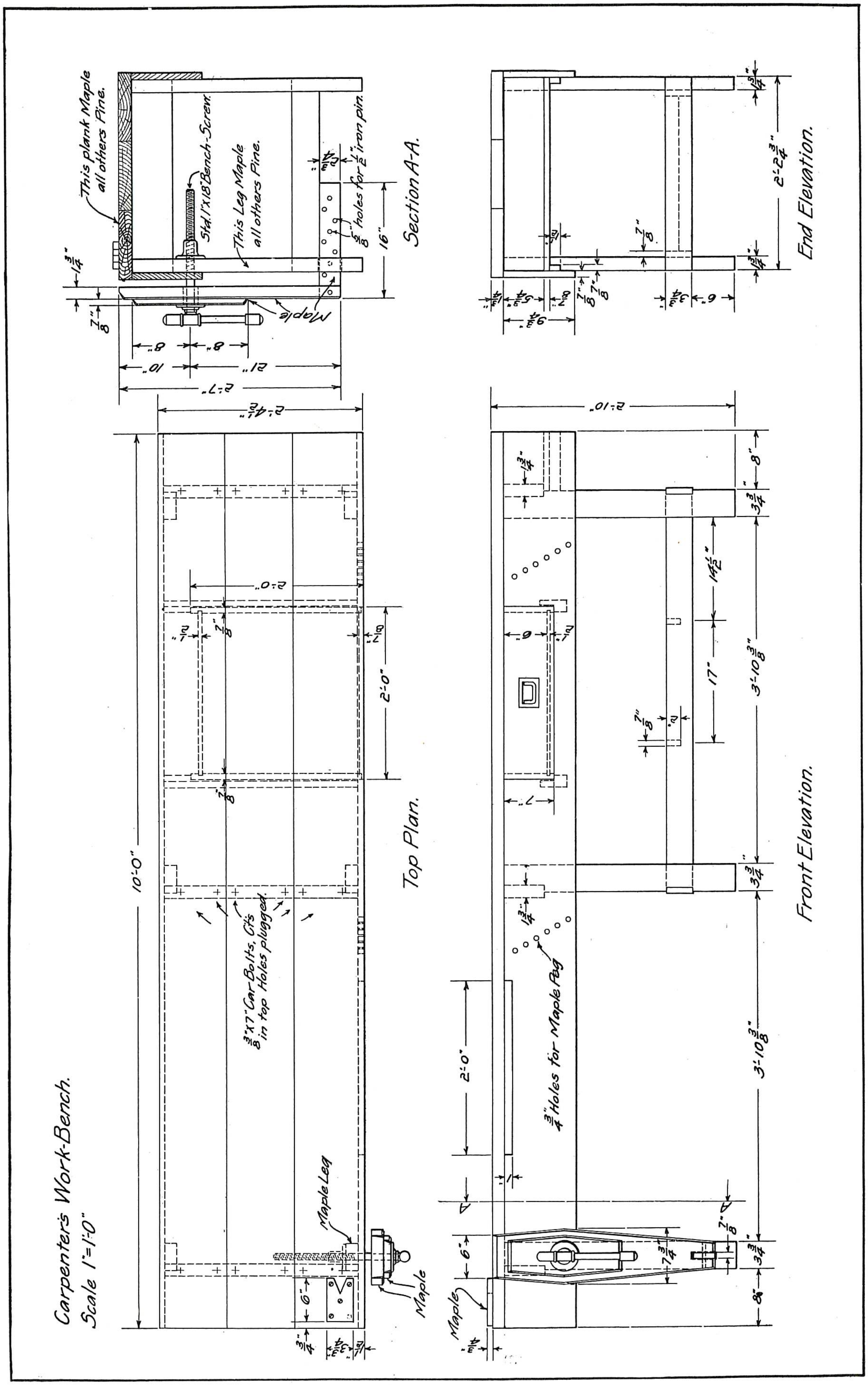
11. Fasten the front support of the vise to the main piece by using four 1½" No. 10, flat-head, bright wood screws; heads of screws to be neatly countersunk.

12. Locate a point on a centerline, drawn lengthwise of the vise 10" from the upper end of the stock, and bore a 1" hole for the bench screw.

13. Fasten bench screw in place on the vise.

14. Fasten the cross rests to the legs by using two ⅜"x4¾" carriage bolts at each joint.

15. Place the leg braces in position and fasten with two 2" No. 12 wood screws at each joint.



Carpenter's Work-Bench.
Scale 1"=1'0"
Top Plan.
Front Elevation.
Section A-A.
End Elevation.
This plank Maple all others Pine.
Std. 1"x18" Bench-Screw.
This Leg Maple all others Pine.
5/8" holes for 1/2" iron pin.
3/8"x7" Car-Bolts, Cts in top Holes plugged.
3/4" Holes for Maple Peg
Maple Leg
Maple
10'-0"
2'-0"
3'-10 3/8"
2'-2 3/4"
2'-10"
2'-7"
2'-4 1/2"

16. Fasten braces in position using two screws at each leg.

17. Fasten cross shelf rests using two 2" No. 12 screws thru the braces into each end of each brace. The upper edge of rests and braces to be flush.

18. Place the aprons and fasten with three 2" No. 12 wood screws into each leg.

19. Cut two openings in the front apron; one to be 1"x2'-0" for a board support and the other to be 7"x2'-0" for the drawer. These openings to be cut at places indicated in the drawing.

20. At the end of bench opposite from the vise fasten the shelf rests at position shown in end elevation. Two 1½" No. 10, flat-head, wood screws should be driven thru each rest and into the apron.

21. Lay the shelf on the shelf rest and fasten with two screws at each end.

22. Shape two pieces of stock 2'-2¾" long for drawer to slide on as shown in the front elevation and fasten in place by driving two 2" No. 12 wood screws thru the aprons into each end.

23. Build a drawer to given dimensions. Stops should be placed so that the front edge of the drawer will close flush with the front apron.

24. Bore a 1" hole in the maple leg and thru the apron for the bench screw; the hole to be on a centerline, drawn lengthwise of the stock 8¼" from the upper end of the leg. Cut keyway for the key on the nut of the bench screw and fasten nut in place with screws.

25. Bore a ⅝" hole thru the maple leg for the iron pin.

26. Bore ¾" holes in the front apron for maple peg at points shown in front elevation.

27. Place top planks in position. Locate points for bolts as indicated in top plan. Bore holes in planks ½" deep large enough to drop the heads of bolts. Finish the holes with ⅜" bit thru the planks and cross rests. Bolt top firmly in place.

28. Plug the bolt holes.

29. Make a maple bench stop to given dimensions and fasten with five 1¼" No. 8, flat-head, bright wood screws; heads of screws to be countersunk below the surface of the stop.

SUGGESTIONS ABOUT ACTIVITY

Rodney S. Brace, Homestead, Pa.

THE ideas expressed here are not new to many of us. If they are, they should be thought over very carefully and applied. To those who are familiar with them, it is hoped they will be a reminder and a stimulant. We can never allow our best habits to become too fixed.

The active teacher, without other effort than the habit of activity, causes his class to be active and the opposite is true of an indolent teacher. There are all grades between. Some teachers are always active. Their very carriage shows it and their classrooms teem with a half suppressed desire for doing. These teachers seem to say by their every act that there is not anywhere near time in the class period to get all the work done and, if you notice, you will see that the class takes up this idea and follows it out. The indolent teacher has plenty of time between classes, between lessons and between questions. His pupils are like him. They are never in haste to get his attention and when they do get it, unasked, they seldom have any use for it.

Now this applies very closely to hand work. The teacher who gives out just a little—not too much—more than the pupils can accomplish and always gets around to the pupils rapidly, usually finds his pupils very anxious for his help. They know what information they need when he gets to them; they realize that he will not stay for long and that he never allows them to leave their places and approach and interrupt him. "Each must have his turn" is a rule for both pupil and teacher.

In the handwork class where the teacher sits down and allows his pupils to come to him, there is always a tired atmosphere. The teacher may expect a great deal of work but he seldom gets it. If his expectations are realized, the results are little compared with what that teacher might do. The active pupils who could not be held down will be after information, but in every class there will be those who need the help much oftener and who never get it. The teacher is not active enough to go to them and these pupils are either diffident or slow and do not manage to accomplish what the others can.

Apply these ideas to the classes you know—your own, if you will—and see if they are not true. The teachers you know may not be very active or very lazy, but they are somewhere between and, wherever they are, their condition needs attention.

Of the lazy teacher we need say no more, but the active one is not a tireless individual. He needs to be careful of his activity and to limit it. He must plan his work and be fair to himself as well as to it. The broken down teachers we find around us are not the lazy ones, nor are they the active ones who have planned ahead. They are the active ones, it is true, but the active ones who have allowed their enthusiasm to carry them far beyond the strength which was allowed them. Instead of using activity to conquer the world, they have allowed activity to conquer them. Now you may decide which is the greater sin: To be a lazy teacher or to be an active one who has worked herself or himself—for there are a few men in this class—to a condition of physical inability.

INDUSTRIAL-ARTS MAGAZINE

EDITORIAL

A SMALL HORIZON.

A TEACHER of teachers in science who had been given the chairmanship of a committee to formulate outlines of study for secondary schools, by a State Conference of teachers, was recently heard to "lament that in his study of the school problems he found that with adequate science and language there was no place left in the school program for art or music." His case appears to us peculiarly sad. We rejoice that he laments because we believe that his lamentation reflects his one saving grace; but if his lamentation be sincere, he may take courage from the fact that art and music in the schools, together with most of the additions to the school curriculum, including his own physical science, have received sanction from the public rather than from the school authorities unsupported by public sentiment. The report of his committee will add to the quantity but not to the content of educational discussion for a curriculum of science and language would not receive public sanction.

Such a curriculum could not receive favor from school authorities or teachers who view the school problems in the light of modern needs. Language and science are important indeed, but without faith in the proposed reduction of artistic expression to a scientific basis, we believe that science can never supply the need of art because language and science are not comprehensive of life. Neither can we accept the theory that the expression of civilization may be divided into intellectual, moral and artistic according to a popular modern writer. This division places the artistic accomplishments aside from the intellectual, and we believe them to be predominantly intellectual.

NATIONAL AID FOR VOCATIONAL EDUCATION.

THE desire of schoolmen is to do the ideal thing and their habits of analytical thinking lead them to engage in lengthy discussions of each phase of a situation before approving of any proposed action. Insofar as such discussions stimulate intellectual processes they are perhaps educational to those who participate in them but when educators in their controversies lead the public to take issue with some needed legislation, or to postpone action until "the question is settled," then such discussion becomes pernicious.

It is to be hoped that the supporters of National Aid to Vocational Education will not, by a noisy discussion of trivial details of the proposed law, divide public opinion, cloud the issue and thus prevent or postpone action on the part of Congress. The present situation in Illinois is a conspicuous example of what may be expected when those most vitally interested in a measure take to wrangling over details.

The chief consideration in this case is National Aid, and whether or not every detail of the Smith Hughes Bill is satisfactory to us, let us unite on the main issue, and if we *must* discuss details, let us not under any conditions present a divided front to those who have the fate of the bill in their hands.

There are many strong arguments for National Aid, but no discussion of the case further than the Report of the Commission on National Aid to Vocational Education is necessary.

STATE CERTIFICATION OF JOURNEYMANSHIP.

IN every discussion of industrial conditions we hear much concerning the need for the restoration in some form, of the old apprenticeship, by which men were formerly taught their trades but very little progress has been made in this direction. Several states have attempted to promote apprenticeship by a state registry of apprentices and some have attempted to dictate on what terms young persons are to be indentured. In most cases this legislation has led to the abandoning of all apprenticeship. Legislatures seem to have ignored the fact that the principal parties to an apprenticeship indenture, are a boy and an employer, and that to induce these two to enter into a contract some feature of the contract must be attractive to each party.

The employer wants apprentices if he can have them under conditions which do not involve too much hardship, but boys do not seem to want to be apprenticed. What's the use? The fellow who has completed his apprenticeship has no tangible evidence of his experience —no diploma, no certificate of competence. When he seeks a position he must be tried out the same as the man who has "stolen his trade."

There is an opportunity for some state to do some constructive work in this line by providing for state supervision of apprenticeship, and state examination and certification of journeymanship. By this means some standard of attainment would be set for mechanics; trades would be standardized, and levels of competence recognized; boys would complete their apprenticeship in order to secure a state certificate of journeymanship; employers would give preference to certified journeymen, and trade unions would have a standard method for judging of the competence of their members. The skill of the good mechanic would be recognized, while the less skillful one would have something to strive for.

PRINCIPLES AND PRACTICE.

A QUESTION came to us recently from a Normal School teacher that deserves comment: "Do you consider it necessary for a student, preparing to teach design in the public schools to have done some work in *every medium* for which she will teach design?"

In other words: can a teacher teach the design of things she has not executed? We conceive a host of teachers proclaiming in chorus: Oh, Yes! I teach design from principles of design which apply to design of all kinds and in various materials. We believe that it is only possible to teach design with the principles of

good design well in mind, but there is question whether the principles of design applied to a specific problem in design, without consideration of materials and purpose will result in worth while teaching or worth while design.

A good design is an interpretation of a specific purpose under the conditions of material and principle. A good design satisfies purpose, materials, and principles.

The teacher has always sought to reduce the teaching process to an exposition of principle. Industrial Art teaching demands the execution of problems under peculiar industrial conditions, and the teacher who teaches principles of design without bringing the pupils to a contact with particular conditions cannot hope for specific results. We believe that industrial education depends upon training for specific results under specific conditions, and a teacher should not attempt to teach that with which she has had no specific experience.

BOOKER WASHINGTON.

In the death of Booker T. Washington, industrial education has lost one of its strongest supporters. His loss will be the most keenly felt by the members of his own race to whom he has been a prophet and a leader,—a prophet in seeing that the future welfare of his race lies in the individual efficiency of every member,—a leader in inducing his people to become efficient and in providing facilities for such education.

Born, nameless, in slavery, he struggled for an education, working for his board and clothes while attending Hampton Institute, and finally established the great institution at Tuskegee, conducting the first classes in old sheds and chicken coops, especially cleaned up for the purpose, by the students themselves. By his untiring efforts he built up an institution, which, together with its founder, is known and respected over the civilized world.

JUSTIFYING MANUAL TRAINING.

During a conference of an advisory committee of a vocational school being established in a community, an influential businessman made this statement: "I will be glad when we get this school started. It is what we have been wanting for years. Then we will stop this foolishness in these manual training shops around the city,—spending a lot of money for machinery and material, which does absolutely no good." This is not all that he said, but the rest was just a continuation. It is given here to illustrate the opinion which many businessmen have of the manual training work in our schools, and to point out a situation which manual training teachers will find in a number of communities within the next few years. The situation will probably develop whenever a successful vocational school is established.

While teachers may not be altogether responsible for what uninformed persons think of their work, nevertheless, their work will be very much handicapped by adverse public opinion. In a measure, too, teachers are responsible for what the community thinks. Regardless of the merits of the situation, manual training men will soon face a situation in which they must justify their work on an economic basis, or see it discontinued.

The wise teacher will endeavor to have the community thoroly understand the purpose of his work, and the methods which he is using to accomplish that purpose. It would be well for him to make it clear that manual training is not attempting to teach trades, and if he has a clearly defined purpose in his work, he will make it known. He has probably found that the young men who complete his course do not go into industry as machine hands and tradesmen, but as foremen, inspectors, draughtsmen, salesmen and in similar positions wherein a fundamental knowledge of tools and processes is essential to success. He should make it plain to the businessmen of the community just what changes should be made in the work if it is to prepare boys for advantageous entrance into the trades. If the community wishes the manual training work to become more vocational, the director or supervisor should make it so. Under any conditions, the wise supervisor will not make claims for his work, which he cannot demonstrate by actual results.

THE TECHNIQUE OF TEACHING.

We constantly need to remind ourselves as teachers that all of our theorizing and discussing comes almost to naught, unless the quality of the actual teaching is vitally affected thereby.

The teaching part is the exceedingly difficult part of our work. So many eloquent theorizers shrink from the task of going before a class of boys or girls and demonstrating just how the actual teaching process should be carried on.

Such a demonstration should certainly reveal the method of preventing waste in time. It should make clear the proper method of attack on the problem of the day. It should show how to hold attention, how to secure orderly conduct without having to scold or fight for it, and how to get from the pupils the most intelligent effort and the greatest amount of work. With it all, it should demonstrate how fascinating it is for a group of people to engage interestedly and effectively in a piece of work well worth the doing.

Supervisors may well take advantage of the opportunity to indicate to their teachers superior methods and admirable skill by doing considerable teaching in their presence. When a supervisor can take the class in the actual environment and with the actual problems of the regular teacher, and show by actual instruction that his or her theories actually work out under skillful handling, then the teachers will be all the more ambitious and happy to strive for the same superiority.

ENCOURAGING CO-OPERATION.

One of the most encouraging signs of our school operation is the increasing co-operation of the industrial and social institutions with the public schools.

The Brooklyn Eagle reports an interesting example in New York and Brooklyn:

"The Art in Trades Club of New York has been so impressed with the high school exhibit of industrial art that Clarence Whybrow, the president of the club, has planned a series of meetings at which the teachers of the industrial work will have the advice of the best tradesmen members of the club in the conduct of their school work."

PROBLEMS AND PROJECTS

THE Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, presents each month a wide variety of class and shop projects in the Industrial Arts.

Beginning with January 1, 1916, the Magazine will award a monthly prize of $10 for an especially meritorious problem used in the Department. This is not a prize contest in the ordinary sense. Every problem accepted for publication will be paid for. The prize will simply be a reward of merit.

From the material submitted by readers, the Editors will select each month for the award one problem of especial merit, judged from such standpoints as originality, good construction, artistic merit, adaptability to school work, and quality of drawings and photographs submitted.

The brief description of constructed problems should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in *benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work,* and other lines of industrial-arts work are eligible for consideration.

Drawings and manuscripts should be mailed flat and should be addressed:

The Editors, INDUSTRIAL-ARTS MAGAZINE,
Milwaukee, Wis.

THE CONSTRUCTION OF AN EYE MAGNET.

Hans W. Schmidt, Director of Industrial Education, State Normal School, Oshkosh, Wis.

ONE of the dangers existing in the modern shop is that due to flying particles of steel and iron, emery and grit entering the eye and causing at least extreme discomfort, if not permanent injury. This will happen in spite of guards and goggles and exhaust systems, and one of the most painful and dangerous of these accidents is to get particles of steel or iron embedded in the eye. Their removal is nearly always a difficult matter where facilities for such work are lacking.

The shops of the Industrial department of the Normal School here are not free from such accidents, and it was decided to build an eye magnet to remove particles of steel or iron from the eye as well as from superficial wounds.

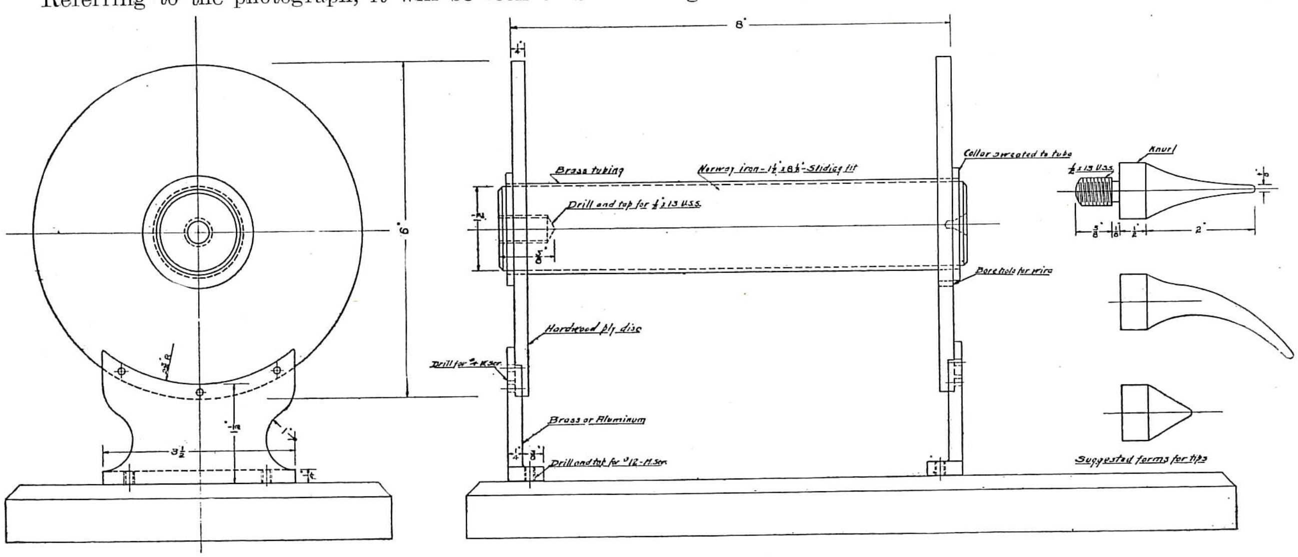
The current available for this purpose was either 110 or 220 direct current, and the magnet was designed to work upon either voltage without an external resistance. The windings are of such a character that at 110 volts the core is magnetically under-saturated, while at 220 volts it is super-saturated. In both cases the attending electrical and magnetic losses are insignificant compared with the usefulness of the magnet at either point.

Without going into the calculations involved in the making of such a magnet, it will suffice, for practical purposes, to give the main dimensions only, permitting latitude in minor details to suit the convenience of the constructor.

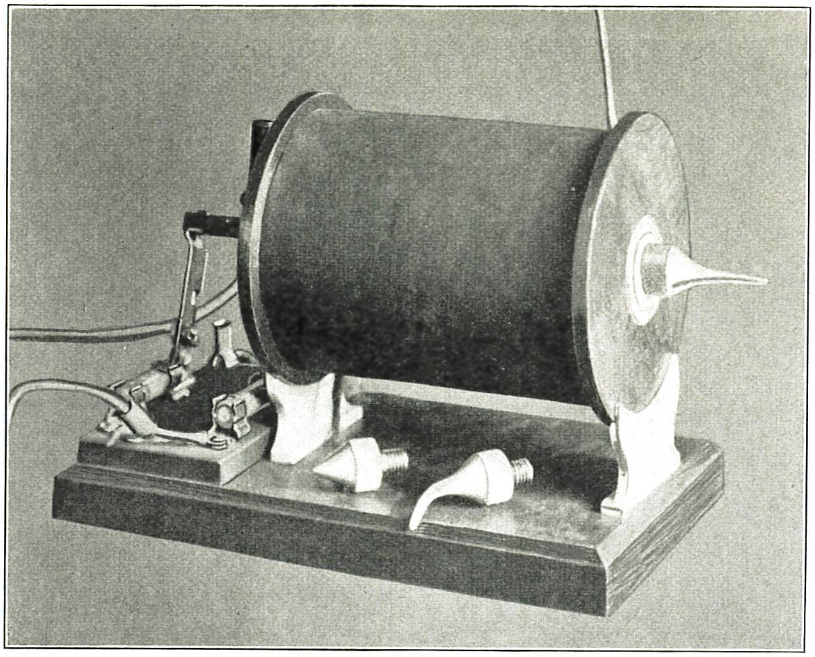
Referring to the photograph, it will be seen that the main features of the magnet are a spool carrying the wire, an iron core with removable tips, and the whole device mounted upon a wooden base with fused knife switch and connecting cord.

The ends are built up of several-ply hardwood, one-fourth inch thick and six inches in diameter. These ends are secured upon a brass tube of No. 20-22 gauge, having an inside diameter of one and one-half inches and provided with small flanges of brass, sweated to the tube to prevent the heads from sliding off. After assembling the tube and ends, wind about five layers of shellaced muslin or Empire cloth upon the tube, this to serve as insulation between the tube and wire and also to hold the ends in place while winding on the first layers. The wire used is No. 21 D. C. C. magnet wire and fifteen pounds are required.

To wind on the wire it is best to place the spool on a mandrel and secure it in a screw cutting lathe, using the reverse motion for winding, in order to get the wire to run over the spool. Before winding, solder the end of the magnet wire to a piece of No. 20 lamp cord about twelve inches long, taping neatly and letting this cord come out thru the hole bored near the center of the spool head. Wind on neatly, and as evenly as possible, two layers of wire; shellac these and cover with a layer of good bond paper. This will permit the winding on of the next layer neatly and evenly. Repeat this order of winding until all of the wire has been wound on the spool. The end is to be secured to another piece of lamp cord and threaded thru a hole bored at the proper place near the edge of the disc. The spool should be laid aside for sev-



Details of Construction, Eye Magnet.



EYE MAGNET.

eral days, or better still, baked in a *very slow oven* for several hours to dry out the shellac.

The core is made of Norway iron as per detail. The removable tips, for which suggested shapes are given, are made of the same material or of mild steel. The end supports may be made of brass or aluminum castings. For a switch, procure a 25 amp. single throw, double pole, fused knife switch. As the switches differ somewhat in size, the base board should not be made until the size of the switch is obtained. The two ends of the winding should be attached to the fuse terminals and the connecting cord to the switch terminals; the cord may terminate in a plug, and it may be attached to the regular lighting socket.

The magnet takes but one ampere at 110 volts and two amperes at 220 volts. As the use of the magnet is but momentary, heating need not be feared. On account of self-induction the switch contacts will arc somewhat at break and the switch should be opened quickly.

When used for the extraction of particles of steel or iron from the eye, have the patient seat himself in front of the magnet with the head on a level with the tip. By means of a dropper, introduce a drop of a one per cent solution of cocaine into the corner of the affected eye; grasp the head firmly between the two hands and guide the eye and particle to within about one-sixteenth inch of the magnet tip. While in this position have an assistant close the switch and in ninety per cent of the cases the particle will jump and adhere to the magnet tip.

Caution: Place the tip as near to the point of entry of the particle as may be so as to utilize the original opening for extraction. In case the particle simply adheres to the eyeball or to the lids, this precaution need not be taken. If the particle adheres to the lid of the eye, the lid may be raised and the tip of the magnet placed under it, when the particle invariably adheres to the tip. In case of wounds containing particles of iron or steel, the tip may be introduced bodily into the wound provided the former is first made aseptic by either heating it, or washing with a solution of bi-chloride of mercury or hydrogen peroxide.

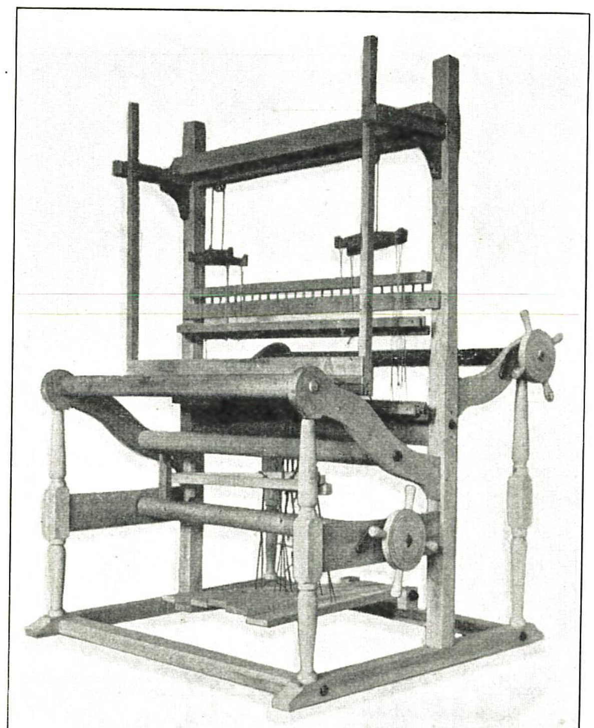
The magnet has proven itself a valuable adjunct to our emergency kit. It may not be amiss to call attention to the fact that this magnet *cannot be used* with an alternating current.

THE MAKING OF A HAND LOOM.

L. Day Perry, Supervisor of Manual Training,
Joliet, Illinois.

THE LOOM illustrated herewith is a distinct modification of a Swedish loom involving turned work. The construction of such a loom may be undertaken, with assurance of success, by advanced eighth-grade shop pupils. It is assumed that the boys' shop experiences began in the sixth grade.

As illustrated, the loom is made "knocked down" to permit of its getting thru an ordinary doorway. The sides are of mortise and tenon construction, and are assembled first. The holes for the rollers are then care-



HAND LOOM.

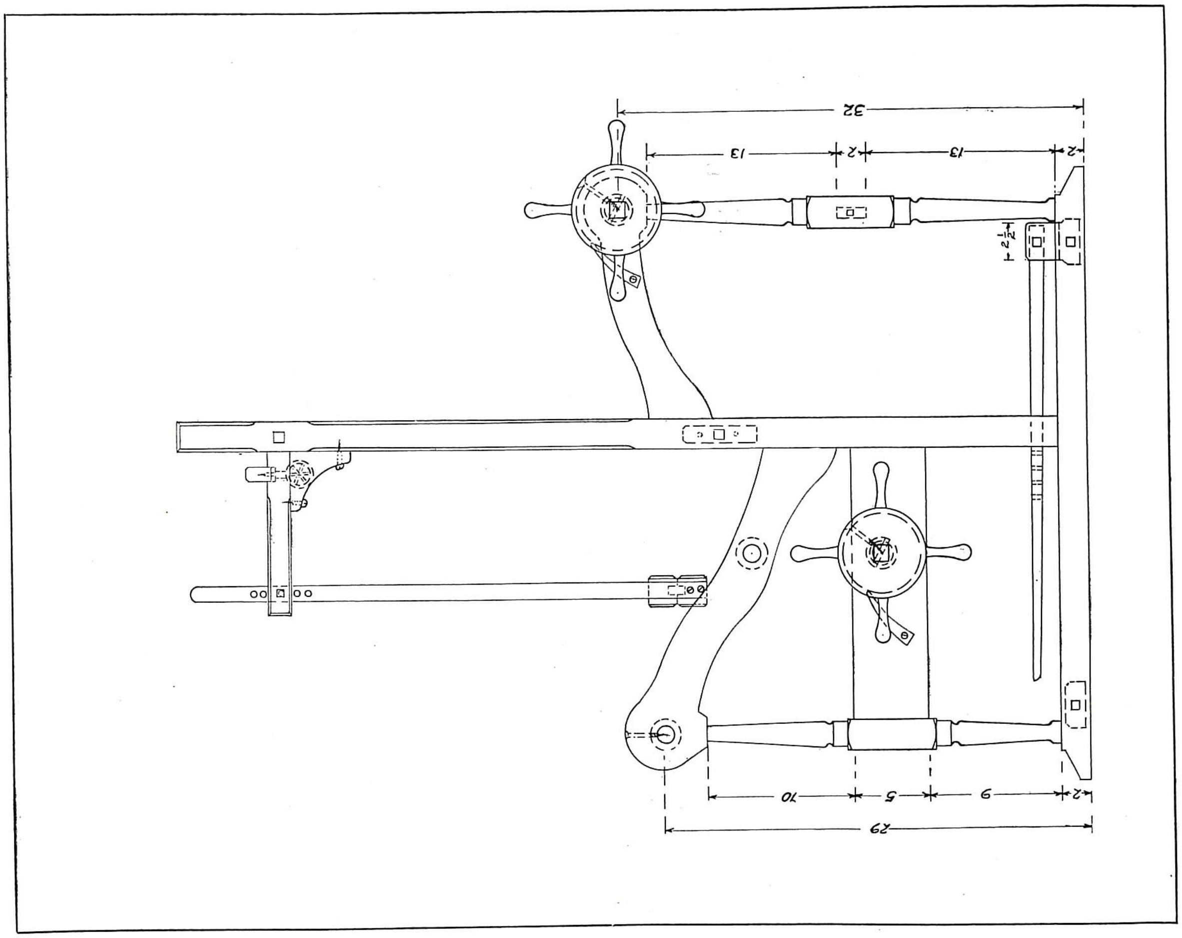


Plate 2. Right Side.

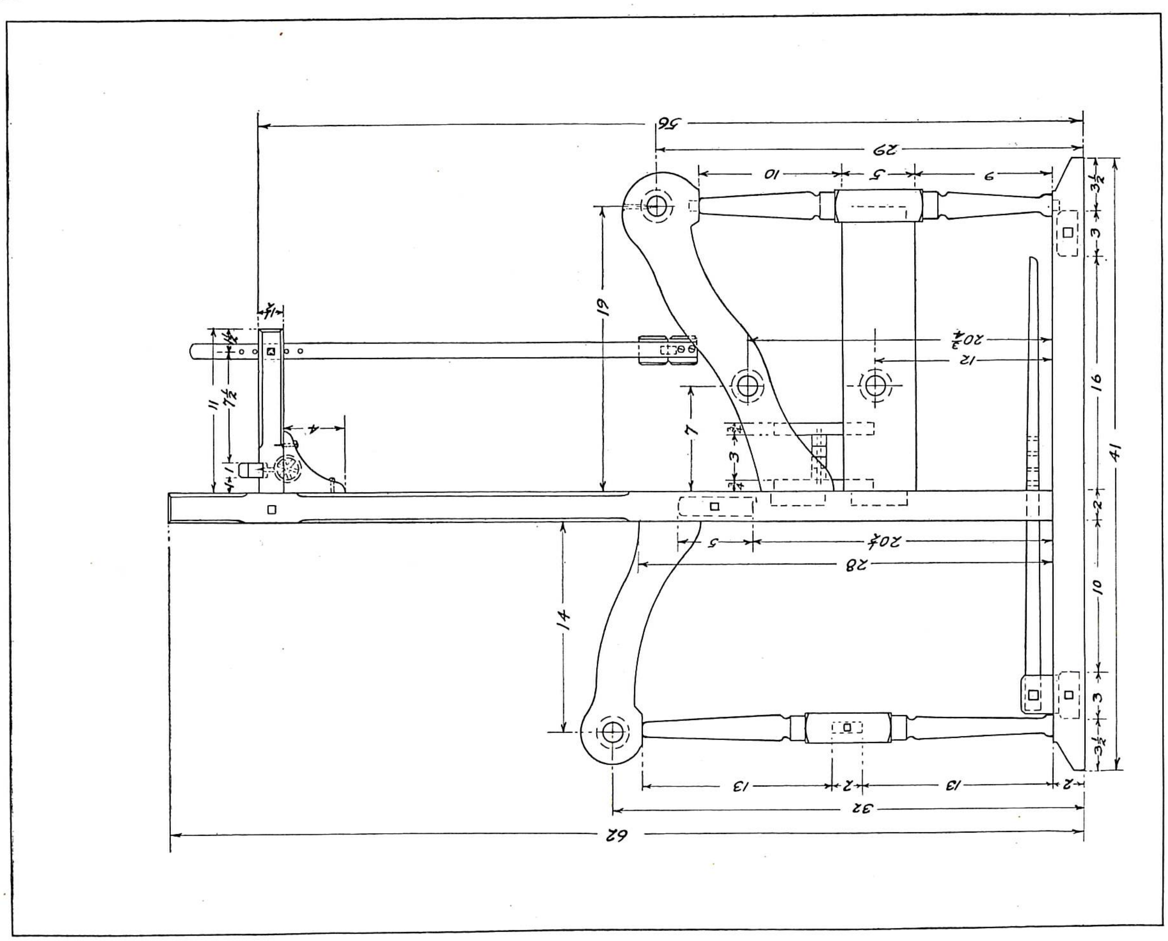


Plate 1. Left Side.

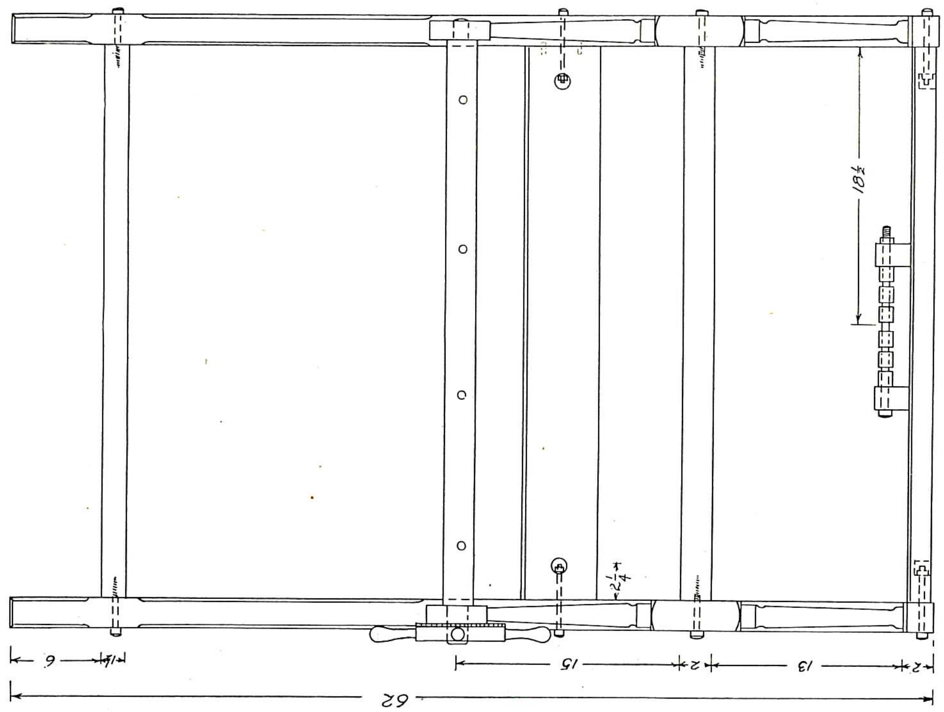


Plate 4. Back.

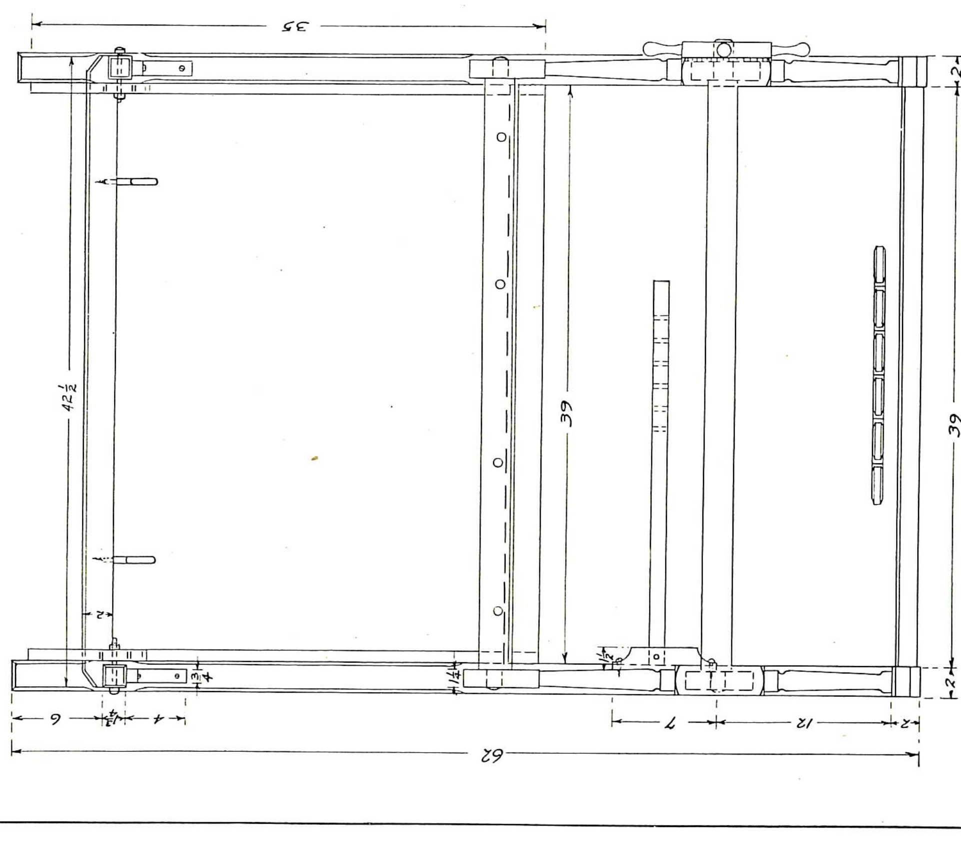


Plate 3. Front.

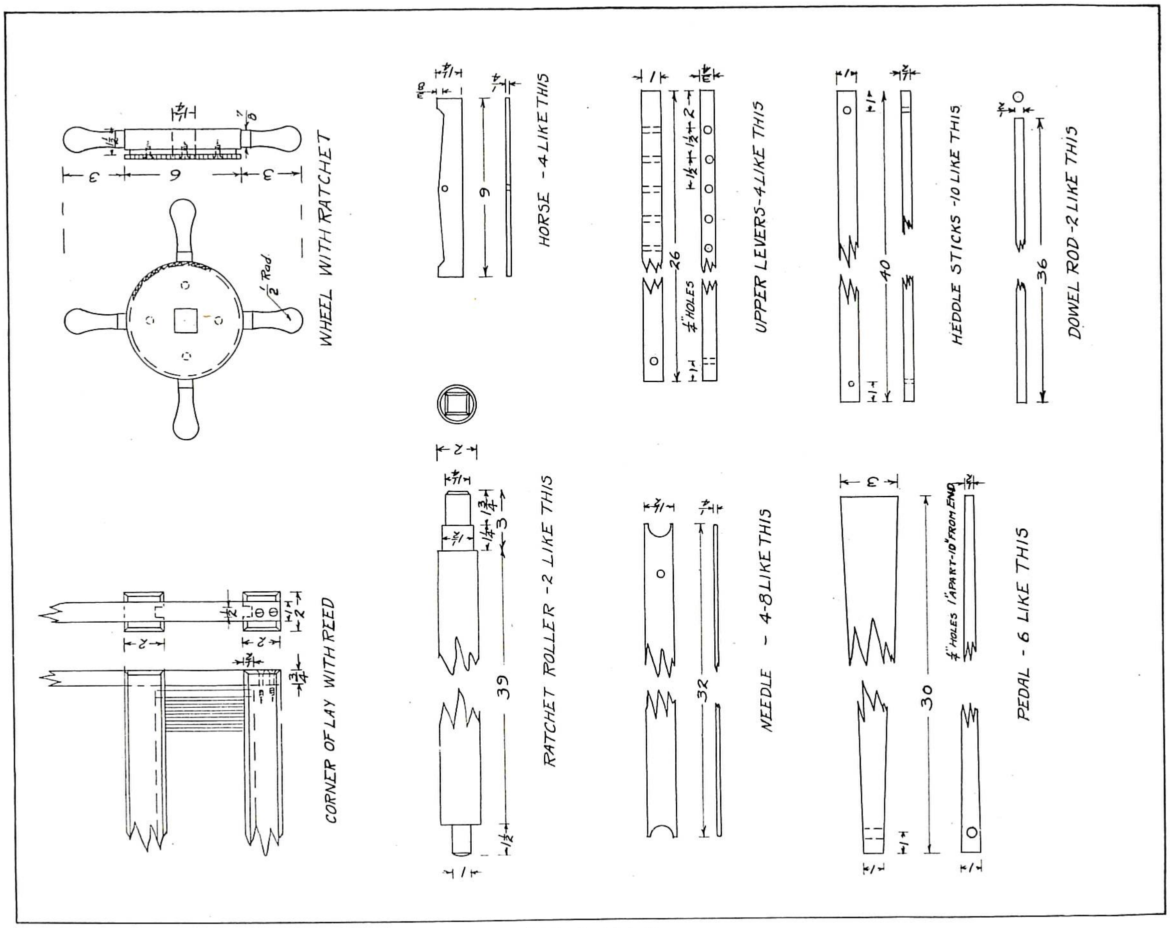


Plate 5. Details.

fully located and bored, and the whole assembled by means of bolts and screws. It is important that the holes for the rollers be bored after the sides are put together, for only by doing it this way can trueness in the rollers be assured. Dowel pins are inserted in the ends of the cross rails and cut off one-fourth of an inch from the end. These fit into holes in the base and center posts and prevent the rails from twisting.

Hard maple is the best material with which to construct the loom for it will withstand the strain to which the loom is subject and, in addition, will not "rough up" with use. It may be stained any color to suit the taste of the maker. However three coats of shellac, the first two sanded and the last rubbed, give a very effective and durable finish.

Looms of this type have been made in our shops by the familiar group method. The turned work is not complicated and inasmuch as it gives an artistic effect to the loom, as well as affords opportunity for effective correlation with turning, it is desirable. However, square tapered posts may be substituted for the turned ones, and octagon wheels for the round wheels. This will leave the rollers to be turned, involving simple cylinder work only.

The labor in sanding the formed arms may be re-

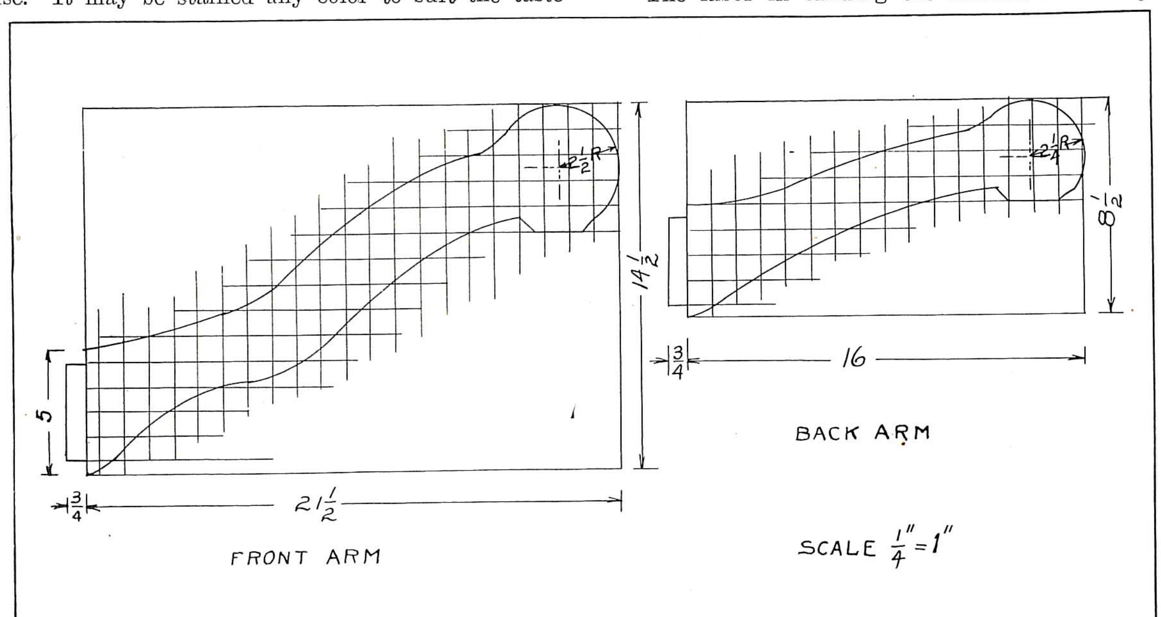
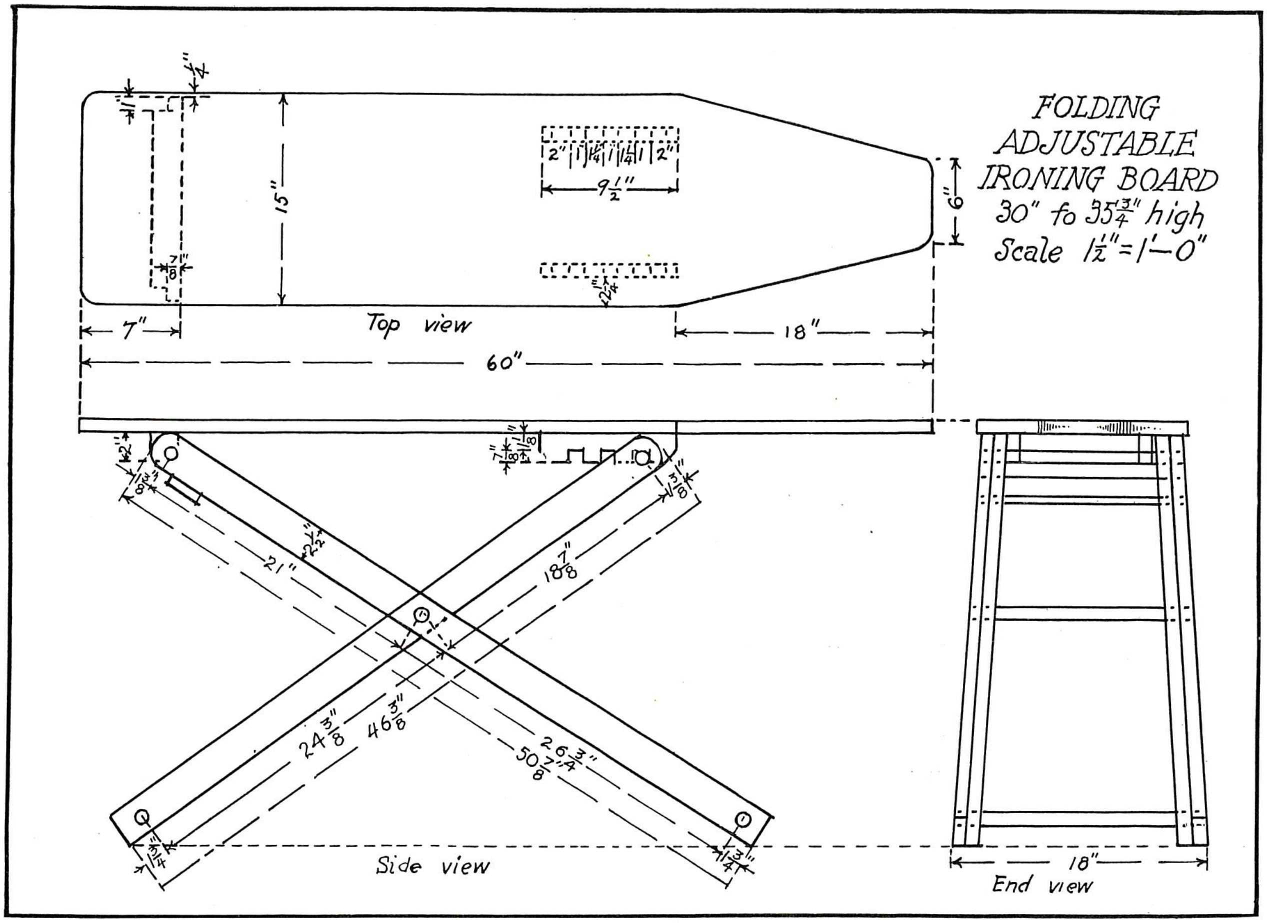


Plate 6. Details.



duced to a minimum if it is done by means of the lathe. Turn a cylinder from a "four by four" and attach coarse sandpaper to it, then sand the arms. Such an expedient is desirable if a number of looms are under construction at the same time.

In the drawings many dimensions have been omitted on a given plate to avoid confusion of figures. The detail sheets give dimensions omitted elsewhere. In some instances, such as detail on the turned posts, dimensions have been omitted altogether. This is not vital, for the instructor may change the form or design on such minor details to suit himself or class. All dimensions are given in inches.

This loom, having six pedals, four levers, and four sets of harness is for pattern or design weaving. By eliminating the levers, and using two sets of harness and two pedals, it becomes ready for rug weaving. It is policy to add these extras to the loom at the time of construction. It is then a simple matter, with little adjustment, to do any form of weaving within the province of a hand loom.

The ratchet wheels and dogs are of cast iron and cost very little. The pattern for either is not difficult to make. The two-inch wheel screw pulleys may be obtained from any hardware store. They cost five cents apiece.

The photograph shows the loom constructed from the attendant working drawings. A spreader is shown attached, altho no drawing for it accompanies this article. The various parts of the loom, with few exceptions, are shown tied up in the same manner as in weaving. This makes clearer the relation of parts to each other and to the loom proper.

NOTE—Leo G. Herdeg, an instructor in the Department, inked and assisted in the drawings. T. Sinclair Moore, also of the Department, took the photograph.

AN IRONING BOARD.

R. M. Jewett, Patterson, Cal.

THE FOLDING IRONING BOARD gives an excellent exercise in the solution of a problem by the graphic method. The student should be given a sketch of the board without any dimensions. He should draw the top to scale at a suitable height for the lowest position; and then mark points on the floor line for the feet, so that the feet under the nose of the board will be about fourteen inches back from a point on the floor line vertically under the nose end; and the feet under the square end will be about two inches inside of a similar point under that end. The legs should then be drawn and the parts measured by the same scale used in laying out the top and height, to determine the length of the leg pieces and the position of the joint where the legs cross. The top remains level in its three positions, as will be seen from the similar triangles formed by the upper and lower parts of the legs.

THE INDUSTRIAL ARTS COURSES at the Oregon Agricultural College are enjoying an increase of 69 per cent in attendance over the year 1914-15. In explaining the remarkable growth of the courses, Mr. Frank Shepard, director of the department, recently declared that the shortage of trained instructors in woodworking, machine-shop practice, foundry work, plumbing and mechanical drawing, and the peculiar excellence of the work offered at the College, are largely responsible for the interest shown.

WINSTON-SALEM, N. C. To make the work of the manual training department of practical value to the students, repairing and renovating of furniture has been introduced. Orders from citizens will be received and filled by the students. The work will be charged for at standard prices and the proceeds will be devoted to the expenses of the department.

ITEMS OF CURRENT INTEREST

PENNSYLVANIA CONTINUATION SCHOOLS.

In view of the fact that the Cox Child Labor Act becomes effective on January 1st, arrangements are being made to establish continuation schools in the school districts of Pennsylvania. All minors between the ages of 14 and 16, who have work certificates, except those employed on the farm or in domestic service, will be required to attend. These schools must be in session the same number of weeks as are the regular schools. It will be necessary for each pupil to attend a continuation school eight hours per week. He may be present a period of eight hours on one day per week and two days of four hours or four days of two hours each; or if thought advisable, the instruction may be given continuously, provided the total number of hours be equivalent to eight hours per week during the school year.

All of the continuation schools must be approved by the State Department of Public Instruction in regard to location, equipment, courses of study, qualification of teachers and method of instruction.

The schools may be conducted either in the regular schoolhouses or in factories and stores. Many manufacturers and merchants have fitted out rooms in their establishments where instructors from the school department will come to execute the work planned.

When a school district has fulfilled the regulations of the Department of Public Instruction, that district will receive from the Commonwealth financial assistance as stated in the following schedule:

Each district receives for each class A teacher for the continuation school, $200, teacher of class B, $150. Teachers of class A include all who have had three or more years' teaching experience in Pennsylvania; class B includes all who have had one to three years' teaching experience in Pennsylvania. Teachers of both classes must hold special certificates.

Each school district receives fifty per cent of the cost of academic equipment, fifty per cent of the cost of equipment for variable vocational work, and fifty per cent for fixed vocational work.

The time in the continuation school will be divided in such a way that forty per cent will be given to academic subjects, continuating the general education of the child; thirty per cent to fixed vocational subjects, which are those common to the industries; and the remaining thirty per cent to variable vocational subjects; the character of which depends upon the industries of the community.

The following outline of work has been prepared and sent out by Mr. Millard B. King, Director of Industrial Education.

The academic subjects shall consist of: (a) English—letterwriting—spelling of trade names—reading of semi-technical trade articles—writing of compositions on vocational subjects.

(b) Industrial geography—sources and distribution of raw materials—manufacture, transportation and sale of the finished products.

(c) Hygiene for the worker — personal hygiene — community hygiene—safety first.

(d) Civics—relation of employer to employe—local government—State and National government.

The fixed vocational subjects shall consist of:

(a) Industrial mathematics.

(1) Arithmetic adapted to the industries.

(2) Industrial bookkeeping.

(b) Shop sketching, including freehand drawing and mechanical drawing.

The variable vocational subjects shall consist of:

(a) Study of the machines and the processes at which the pupils are employed during the day. This is to be decided by the local community.

Governor Brumbaugh on November 19, issued a statement regarding the establishment of continuation schools. He said in part:

"Reports made to me by the State Departments of Public Instruction and Labor and Industry, indicate that at least three-quarters of the children now working in the State will be provided with continuation school facilities.

"I am especially pleased with the attitude which employers of children generally have assumed. I am informed that wherever the schoolmen have gone to places of business personally and talked with employers, explaining to them the benefits which would accrue both to them and to their young employes under this Child Labor Law, that they have expressed a willingness to meet all its provisions.

"I am particularly pleased with the manner in which the situation has been handled in Philadelphia. Four distinct steps have been taken by the Board of Education in that city.

"In Pittsburgh a complete canvass of the city has been made to ascertain the number of children in employment. Provision has been made for the establishment of schools or classes in various sections of that city.

"In Bethlehem the high school will be used to house the continuation classes.

"The school authorities of Reading are at present interviewing manufacturers on the subject of organizing continuation schools. Dr. Foos, Superintendent of Schools, reports that in all these interviews he has been cordially received.

"Complete arrangements for the establishment of continuation classes are also being made in Scranton, Wilkes-Barre, Allentown, Johnstown, Altoona, Lebanon, Easton, Beaver Falls, Mauch Chunk, Harrisburg, Williamsport, York, and many smaller communities."

THE INDUSTRIAL ARTS COURSE OF THE PUBLIC SCHOOLS, LEWISTON, IDA.

Ray E. Williams, Director of Manual Training, Lewiston, Ida.

The course of study of the Lewiston schools has been arranged with the aim of giving the pupil the greatest opportunity of realizing on his latent abilities, to enlarge his scope of usefulness and make him master of himself, to broaden his course of training and direct it in such a way that his abilities can be made marketable.

The manual arts course begins with the sixth grade and continues thru the junior and senior high schools. Every project in the grades and in the high school is in itself a useful article for the home, school or playground.

Supplementary exercises are offered in all grades in shopwork, in addition to those required for a grade; thereby provision is made for the fast worker, and some opportunity offered for individual choice. All students above the seventh grade, in order to receive credit, are required to spend at least one-fourth of their time making or repairing apparatus for the school. Our boys learn by doing, and the manual arts department has always aimed to be of service. Students are permitted to bring such repair work from home as they can do successfully under the direction of their teacher.

Drawing is closely correlated with shopwork, both in the junior and the senior high school. A working drawing must be made in the drawing room and a material bill figured before the project is made in the shop. Mechanical drawing is the language of our shop, and the drawing classes afford splendid opportunities for the discussion of practical shop problems.

Practically every boy in the department has done something on his own initiative. There are few boys who will not work diligently when they are working out some plan of their own. Quite frequently a boy desires to

make a project which is a little in advance of his grade; but he is capable of doing the work by working extra time. In such instances the student is encouraged to do so, but is required to make a careful study of his problem and produce a good working drawing before any work is done in the shop.

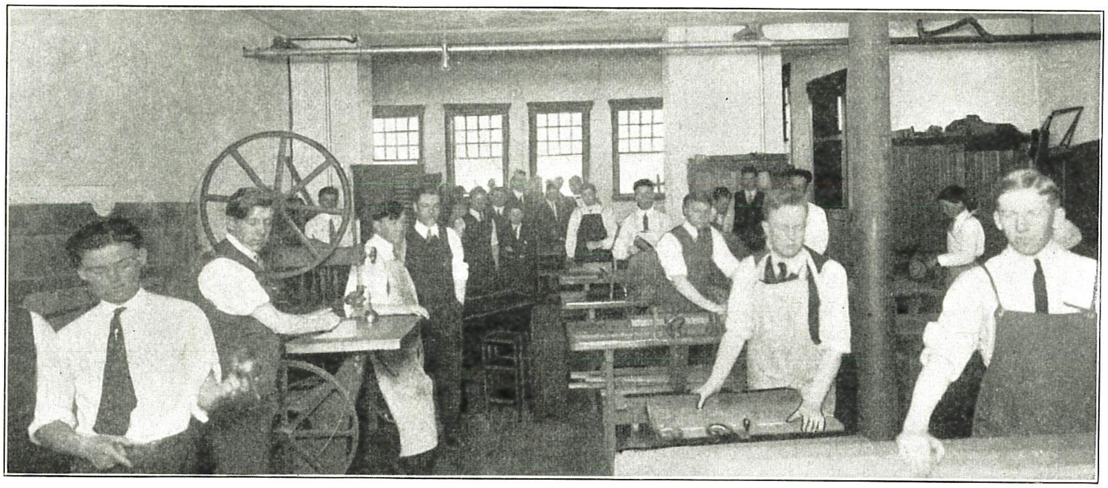
The drawing course of our senior high school includes one year of cabinet design, one year of machine drawing and one of architectural drawing. The class in cabinet and furniture design makes drawings, tracings and blueprints for all furniture made for the school. The course in machine drafting covers the helix, threads, bolts, cams, belting, pulleys, gearing and a little machine design. The students of architectural drafting, to secure credit must draw plans including details, floor plans, framing plans, roof plans, etc., with at least one elevation, and make tracings for a cottage or its equivalent.

Five hours per week is required of all manual students, three hours of shop and two of drawing. A complete course in practical forging has been outlined and blueprints made for all of the exercises covering the year's work. Plans for the forge shop have been drawn by the architectural drawing class and a shop will be built by our manual-training classes.

The following are some of the articles made:

10 Mechanical Drawing Benches with five drawers each.
12 Typewriting Tables with two drawers each.
2 Library Tables.
2 Diningroom Tables.
1 Filing Cabinet with sixty shelves.
15 Stools.
1 Teacher's Desk.
3 Bookcases with glass panel doors.
3 Dictionary Stands.
40 Picture Frames, besides apparatus for the gymnasium and athletic grounds.

Since only one-fourth of the time is devoted to building equipment for the school, the articles listed above represent only a small part of the work done by our boys; they have made much furniture for their homes. Our boys will effect a saving to the community of more than $1,200 for the year.



WOODWORKING SHOP, LEWISTON, IDAHO.

INDUSTRIAL EDUCATION IN MAINE.

The annual meeting of the Department of Industrial Education held in connection with the Maine State Teachers' Association at Bangor, October 28th and 29th, showed evidence of the rapid progress of industrial education in the state. The program was in charge of Mr. B. H. Van Oot, the state's director, who had the opportunity of selecting for discussion those topics which were of greatest importance to the state. There were two sections to the program, the first devoted to problems of state-wide importance and the second to problems which are in the process of development in several parts of the state.

One of the interesting lectures was delivered by Mr. R. H. Verbeck, Principal of Parsonsfield Seminary, on "Manual Arts and Agricultural Problems." Mr. Verbeck outlined the courses in manual arts which are being given in his school and discussed briefly the principles underlying his work. The course, he stated, is very broad, covering work in wood, metals, concrete and other materials generally used in repair work in the making of such articles as hoppers, troughs, trap nests, silos, cement walks, drains, wagon parts, hot beds, lawn rollers, chicken brooders, egg and fruit crates, and such other articles as are commonly used on the farm. He stated that the boys developed a great deal of skill in the manipulation of the various materials but he added that the emphasis was placed, not so much upon the skill the boys acquired, but upon the principles of agriculture which they learned while constructing the various farm implements. Surrounding the making of these projects there is a rich field of literature, mathematics, farm hygiene, science and history which forms the basis for academic classroom study. Parallel to this work there is the study of the problems of feeding, sanitation, exercise of stock and care of fields and orchards which lend themselves to application in the manual arts work.

The second paper was read by Stephan E. Patrick of Westbrook, who described the work which is being done in the co-operative schools under his direction. The school, he stated, was founded for the express purpose of training skilled workmen for the mills at Westbrook. The school is supported partially by a fund donated by the owners of the mills, and partially by the city. Mr. Patrick stated that tho the aim of the school was to prepare workmen for the mills, yet a large proportion of the graduating students never found employment therein, but either went to college or found employment elsewhere. The courses of study are closely correlated with the making of paper and machineshop practice; the students spend one day each week in the mills studying the machine parts and the processes of manufacture. This work forms the basis for classroom study.

One of the interesting features of Mr. Patrick's work is the manner in which the industrial and academic studies are handled. Each student has a thoro preparation for an industry, but, if he elects to enter college, he is admitted conditioned in modern languages, and is given credit for his shop training. Mr. Patrick's work is an excellent illustration of how industrial education may be a part of a liberal education.

Professor D. F. Pearce, of the Department of Education of the University of Maine, gave a very interesting paper on the topic: "The Influence of Industry on Civilization and the Proper Place of a Course in Industrial History in the Public Schools." In dealing with this topic Mr. Pearce traced the development of industry from pre-historic periods down to the present time and showed at each stage of its development, the influence industry has had upon the social, political, and economic life of the nations. He cited the sources of many modern industrial problems such as Trade Unions, Child Labor, Industrial Education, Workingmen's Compensation, Minimum Wages, Widowed Mothers' Pensions and Reciprocity, and outlined the influences of these upon the education of the masses.

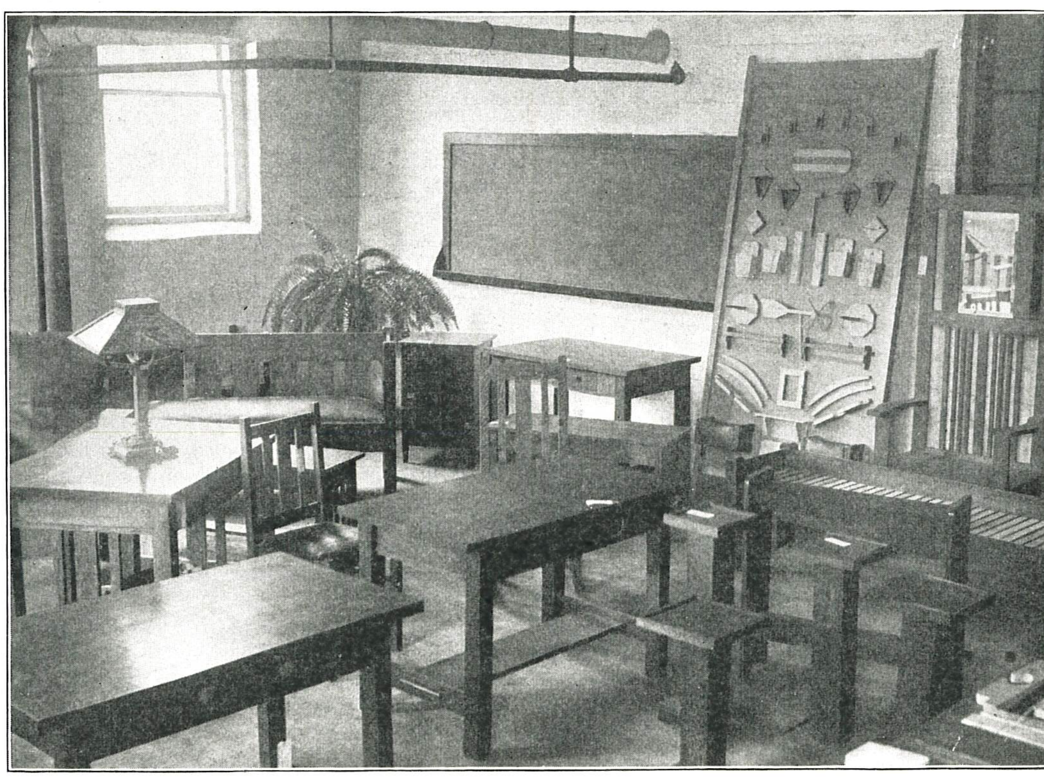
Professor Pearce suggested that with the introduction of industrial subjects into the curriculum, there should be a parallel course in industrial history so that students will obtain an historical basis for the discussion of such topics as are current in the newspapers and magazines. He pointed out the needs for such a course and showed the influence such information would have in shaping the attitudes of persons engaged in industry.

Mr. D. F. Meserve, of Calais, in a talk on "Local Co-operation," gave what seems to be a solution for the shop problem in small communities, especially communities where little money is available. He described the cramped quarters in which he had to work a year ago, and showed how he secured the co-operation of all the local organizations—The Parent Teachers' Association, the City Council, Board of Trade, School Board, and Local Clubs—in raising enough money within a short period for the erection of a shop, the work upon it to be done by the boys in the sixth, seventh and eighth grades. The Parent Teachers' Association gave dances, entertainments, plays, subscriptions, and sold the products of the classroom. The city council appropriated extra money; the school children gave entertainments; and the manual training boys did work for individuals thruout the city and put the money into the building fund. In this manner he interested the whole community in the one cause.

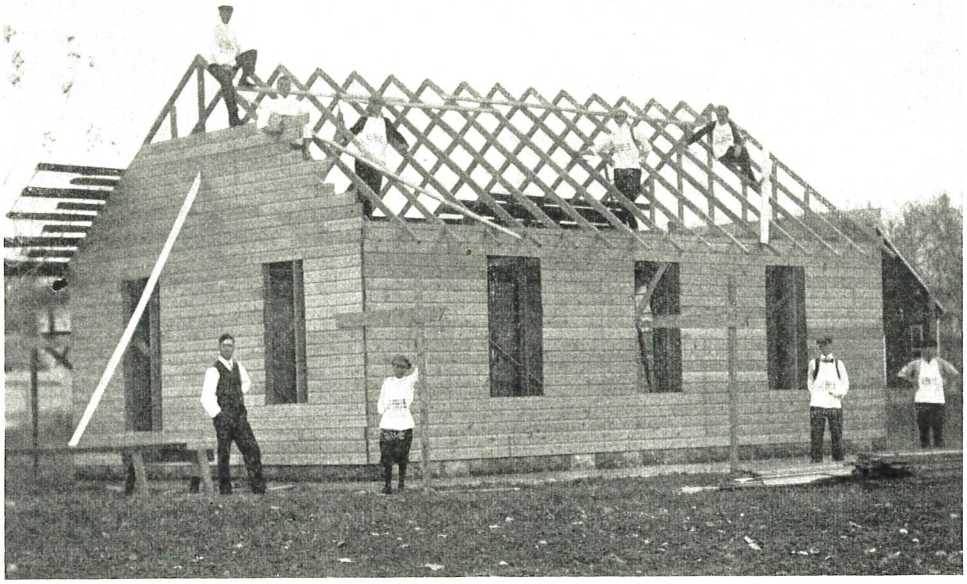
Mr. Meserve showed pictures of a school building the boys had erected—a handsome, one-story and a half building, shingled on the outside, well lighted and ventilated, and with a floor space of nearly twelve hundred square feet. He suggested ways by which other towns similarly inconvenienced by cramped quarters could carry out the same plans. His talk was enthusiastically received and no doubt will be the means of opening similar work in other parts of the state.

The second part of the program was devoted to the discussion of problems of local interest. Mr. E. W. Ireland of Auburn, and Mr. N. E. Corthell of Bath, outlined plans which are under way for the establishment of part-time and co-operative schools in connection with the local industries of their respective cities. Mr. W. H. Morton of Portland, described the system of credit for manual arts' work as it is practiced in his city. The talk was especially interesting and instructive to the teachers and superintendents of those cities who have manual arts' work in the schools but who have not as yet established a system of credit for the work. Mr. Benjamin C. Kent of Bangor, gave a talk on "Machine Shop Problems." The boys in his department manufacture a speed lathe as part of their regular machineshop course. He stated that there is a distinct line between trade school education and the kind of training he gives his boys, the latter receiving all the manipulative work found in the average trade school and the added educational values of the high school. Mr. G. E. Hutchinson of Gorham, discussed the possibilities of establishing pre-vocational classes in connection with the regular graded schools of the larger cities. He outlined possible courses that could be established and cited the many benefits to be derived especially in the larger cities.

After the regular meeting of the Department of Industrial Education, the Maine Manual Arts Club, of which Mr. Stephan E. Patrick is President, held its regular monthly meeting. State problems were discussed and final action was taken on the Smith-Hughes bill. Each member was urged to write his representatives and senators asking that they support the bill in its essentials.



A Portion of the Manual Training Exhibit recently held at Brookings, South Dakota.
Mr. J. W. Browning, Superintendent of Schools.



MEETING A SITUATION.

An overcrowded high school building at Germania, Ia., made the removal of the manual training department imperative in September, 1915. The boys of the class met the situation by erecting a complete shop building. Mr. A. K. Plank, principal of the Germania schools, supervised the work.

FOR MEN TEACHERS ONLY.

A PRIZE will be given to the man teacher who first sends us a list of correct answers to the following questions on domestic art which were prepared for the publishers of Webster's Dictionaries. There are two conditions, viz.: The questions must be answered within the limit of ten minutes; and there must be no help received from the gentler sex.

What is embroidery?
What is the Kensington stitch?
What is a gusset?
What is a flounce?
What is cheviot?
What is rep?
What is gingham?
What is satin?
What is corduroy?
What is velveteen.
What is basting?
What is a hem?
What is an overhand stitch?
What is a ruffle?
What is a gore?
What is a placket?
What is damask?
What is drawn work?
What is herringbone stitch?
What is hemstitching?
What is velvet?
What is long cloth?
What is worsted?
What is felt?
What is flannel?
What is a twill?
What is a backstitch?
How is cloth mercerized?
What is tatting?
What is insertion?
What is coronation cord?
What is crocheting?
What is a bias?
What is fluting?
What is knitting?
What is rickrack?
What is overcasting?
What is spinning?

ROCHESTER, N. Y. Continuation courses for employes of department stores have been begun under the direction of Miss Harriet Armstrong of Portland, Me.

KANSAS CITY, MO. A printing course has been introduced at the Manual Training High School. The shop is equipped to accommodate fifteen students at a time, and classes are open to all students. The instruction includes practical typesetting, proof reading and presswork.

PHILADELPHIA, PA. The school board has continued the plan of having the boys in the manual training classes do practical carpentry work for the schools. Tables, lunch benches, stands, book racks and other pieces of school furniture will be constructed and turned over to the various departments as rapidly as the work can be completed. The plan was begun as an experiment last year and proved that a reduction in the cost of operating manual training centers could be effected.

EAST CLEVELAND, O. A class of 325 girls has begun a course in practical housekeeping in the graded schools. An old residence has been fitted up for the purpose and all girl students will pursue their work in this building.

LAFAYETTE, IND. Classes in printing, sheetmetal working, carpentry and cabinetmaking, millinery and dressmaking, and salesmanship have been formed at the Vocational School.

EVANSVILLE, IND. Classes in stationary engineering, furniture construction and painting are planned for the present school year. In addition, courses in machineshop practice and drafting, sheetmetal pattern drafting and shop work will also be introduced.

EAU CLAIRE, WIS. The girls of the Industrial School recently canned a large quantity of fruit at the school. Fruit, jars and sugar were furnished by the pupils and the completed product was taken home. Canned fruit was sold to housewives at actual cost of materials.

STATISTICS covering the tax levy and expenditures for the industrial and continuation schools of Wisconsin have just been issued by State Supervisor Warren E. Hicks. The figures show that schools are being conducted in 29 cities of the state and that the expenditures per capita for the trade and continuation schools vary from $6.81 in La Crosse to $24.97 in Eau Claire. The cost of instruction thruout the state was $228,745.06. The sum of $48,075.53 was expended for equipment and $97,538.51 was spent for contingent expenses and $8,811.23 was spent for special purposes. The City of West Allis ranked first in general efficiency as expressed in tax rate, expenditures per capita and general attendance.

NEW BOOKS AND PAMPHLETS

Industrial Art Text Books.

"A graded course in Art in its relation to Industry," by Bonnie E. Snow and Hugo B. Froehlich, illustrated by George W. Koch. The Prang Company, New York, Chicago.

These texts are based on the belief that the child should, and can be trained in school, for the needs of art in his work and the appreciation of art in his surroundings.

The belief that drawing is but a means to an end, and that representation thru drawing is not the only or best way to give art instruction, has led these teachers of experience to formulate exercises and methods in which the child is given choice in the arrangement of forms and colors thru the design of various useful things.

It is probable that no teachers could be selected with more intimate knowledge of the needs of art instruction, and the methods by which this instruction should be presented, than the authors of these books.

The books are splendidly illustrated with beautiful color and halftone cuts, and the diagrams and text are explicit. The books will serve as an ideal basis for art instruction in the grades and give to the subject a content that is much needed. We predict a very great success for their publication, and a very great improvement in art instruction in our schools as a result of their use.

The Artistic Anatomy of Trees.

By Rex Vicat Cole. 347 pages. 8vo. Price, $1.75 net. J. B. Lippincott Company, Philadelphia.

This is the latest volume in "The New Art Library" published by the J. B. Lippincott Company, which promises to give much needed specific information on kinds of art work and the materials of art.

The book is divided into three parts, treating of "Trees Considered in Relation to Painting"; "The Anatomy of a Tree"; and "The Details of Trees."

This splendid book is not a dry, botanical, analysis of trees, but a treatise of the tree as an art motif and an expression of artistic sentiment. The volume is illustrated by fifty examples of the use of trees by artists from the time of Botticelli to modern art, and 365 sketches and diagrams of trees by the author.

The text is clearly stated and thoro, and the book should be of interest to every student of nature as well as of art.

Progressive Exercises in Typography.

By Ralph A. Loomis. 76 pages, cloth. Taylor-Holden Co., Springfield, Mass.

The first eight pages of this work are given up to rules of composition, directions for holding the stick, removing the type from the stick, and distribution of the type. This is followed by ten or twelve pages devoted almost exclusively to proof marks, rules for the various punctuation marks, definitions of various terms used in printing, and brief descriptions of certain items of equipment such as leads, slugs, etc. About thirty of the following pages are devoted to brief directions for exercises in composition, and to numerous and varied specimens illustrating proper forms. The specimens are especially attractive and well selected. The exercises range from the simplest business cards to the advanced work of letterheads, menus, programs, and tabular work. The last seven pages contain questions, problems and computations in printing. The rapid introduction of printing into the schools should afford a ready demand for such a book.

Advanced Machine Work.

By Robert H. Smith. 575 pages. Price, $3.00. Industrial Education Book Company, Boston.

This volume is the advanced text of a two-book series on the subject of machineshop work. It treats of engine lathe work, cutting tools, measuring, turning, fitting, threading, chucking, reaming, mandrels, curve turning and forming, inside calipers and micrometers, boring and inside threading, brass finishing, broaching, drilling jigs, boring, boring bars and machines, eccentric turning, nurling, cutter grinding, planing, milling, gear cutting, toolmaking, spiral milling, and methods of locating holes of precision in jigs and fixtures.

The schedules of operations given provide the student and teacher with a complete plan in table form, for the rapid production of standard and typical problems in machine construction.

The book will be valuable to instructors in supplementing lectures and in answering innumerable questions. It will supplement the instruction of apprentices and the experience of the machinist, and will supply the "handy man" an opportunity to perfect himself in lines of work other than that in which he is engaged.

Every machineshop instructor will welcome this text in his classes, as it gives complete directions for performing all of the intricate machine work on a number of good school projects.

Knitting Without "Specimens."

By Ellen P. Claydon and C. A. Claydon. Cloth, 205 pages. $1.00 net. E. P. Dutton & Co., New York.

This book is a detailed and excellently illustrated description of a great number of articles in the process of being knitted or crocheted. These problems begin with the very simplest articles involving the simple elements of knitting. A sequence of steps and difficulties is followed, until articles of considerable size and complication are undertaken.

Anyone interested in doing some of this work would do well to have such a book. It treats in a most interesting and practical way what has almost become a lost art in this country.

Elementary Embroidery.

By Mary Symonds. 182 pages. Cloth. The Macmillan Co., New York.

Embroidery as a subordinate and decorative feature of domestic art work is receiving considerable attention in the schools. This text gives a full, clear, well illustrated description of the various stitches, methods, etc., in embroidery work. Many of the illustrations are in two colors, which fact makes the patterns and the various steps stand out clearly. The book, undoubtedly, will be of great help to those interested in doing this kind of work.

Youth, School, and Vocation.

By Meyer Bloomfield. Introduction by Henry Suzzallo. 273 pages. Price, $1.25, net. Houghton Mifflin Company, Boston.

Persons engaged in vocational guidance work will welcome this addition to the literature on the subject. In it, the author has given a large quantity of valuable material dealing with the entire problem. After several chapters dealing with the theories of vocational guidance, a review of guidance work in Europe is given, followed by definite suggestions regarding organization of such work. A large amount of suggestive material such as record cards of existing bureaus and bulletins describing various vocations, is also given. A very complete bibliography is also included.

Decorative Design.

By Joseph Cummings Chase. 73 pages. Cloth, $1.50, net. John Wiley & Sons, Inc., New York, N. Y.

This is a useful book for teaching the design of printed ornamentation. It is fully illustrated with excellent examples of units, patterns, and posters.

Section I defines and explains kinds of design in two dimensions.

Section II shows the derivation of conventionalized motives.

Section III treats of lettering as used on book-covers and advertisements, with notes on the use of colors and the processes of photo-engraving.

In Section IV problems in design are given which have been propounded by the Board of Regents of the State of New York.

Simple Art Applied to Handwork.

Volume I. By H. A. Rankin and F. H. Brown. 245 pages. Price, $1.25, net. E. P. Dutton & Company, New York.

The ornamentation of handmade objects by brush strokes, geometrical pattern, stenciled pattern and needle work is presented in this book as an aid in the manual arts.

The book is illustrated with elaborate designs in these methods. The final chapter is on lettering and its application.

Thurstone's Freehand Lettering.

By Louis L. Thurstone. B. D. Berry Company, Chicago.

A series of twenty plates bound in paper covers, which are designed to give practice in freehand lettering by tracing the forms of the letters, between dots and within given spaces, which regulate the forms of the letters.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of readers who may have problems and questions which trouble them. The editors will reply to questions on industrial arts, which they feel they can answer and to other questions, they will obtain replies from persons who are competent to answer. If an answer is desired by mail, a stamped envelope invariably should be enclosed.

Address, Editors, Industrial-Arts Magazine, Milwaukee, Wis.

A High-School Woodworking Course.

276. Q:—We wish to install a text in four classes of first-year high-school woodworking. Can you recommend one?

A:—*Griffith's Essentials of Woodwork.* Manual Arts Press, Peoria, Ill.

King's Elements of Construction. American Book Co., New York and Chicago.

Noyes' Handwork in Wood. Manual Arts Press, Peoria, Ill.

Refinishing Old Mahogany.

279. Q:—Will you kindly give me minute instructions on how to refinish old mahogany?—*W. S. T.*

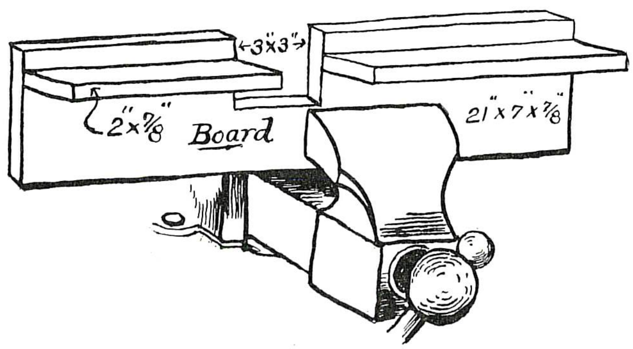
A:—If the wood has a varnish finish, the first job is the removing of the present finish. There are many varnish removers on the market, almost any of them being strong enough to dissolve the varnish. Apply according to directions. Then rub the wood with steel wool, rubbing with the grain. This will remove the filler which remains in the pores of the wood. Then sandpaper the surface with No. 00 sandpaper being careful to rub with the grain, that is, parallel with the fibres of the wood. In refinishing, perhaps the best method will be to use a commercial filler (Johnson's is good). Buy the mahogany filler, and use it according to directions. After the filler has hardened, but do not allow it to harden without rubbing it in, and rubbing off what will not rub into the pores of the wood, sandpaper lightly with No. 00 sandpaper. Then in a room free of dust, apply the first coat of varnish, allowing it to dry 48 hours, when a second coat may be applied. A wash of lime water or of a solution of bichromate of potassium will make the mahogany a deeper color.

There are a number of ways of finishing mahogany each giving a different effect. A very satisfactory dull finish may be secured by the application of a coat of "underlac" or similar finish, and a coat of wax. In the July, 1914, issue of the INDUSTRIAL-ARTS MAGAZINE will be found a detailed description of the various methods of finishing.

Brazing Band Saws.

291. Q:—Please describe a method of brazing band saws.—*T. B.*

A:—Band saws are fastened together by brazing with a hard solder. The solder can be purchased from a dealer, and it is called "Silver solder." It costs about 75 cents an ounce. The solder is about three-fourths of an inch wide and very thin.



The method used in soldering is to prepare the ends of the saw by filing a short bevel. The length of the lap depends on the size of the saw. Two or three teeth in length is suitable for the lap. The saw is held in a cast iron clamp while brazing. This clamp is made expressly for the purpose. When the saw is fastened in place a piece of solder is put between the laps, also some borax. Heat is then applied until the solder flows.

The simplest way to heat the solder is to use a heavy pair of tongs which can be heated in a forge fire. When the tongs are just a red heat squeeze the laps until the solder flows. It is a good plan to have another pair of tongs with a black heat in them, to catch the lap after the hot one is removed. This squeezes the lap tight, and chills it so that the laps cannot come apart when released with the tongs. The reason that the last pair of tongs used is given a black heat, is not to chill the saw too quickly, and so temper it too hard.

A form to hold the ends of the saw can be made out of wood. (See drawing.) The square cut-out of the center, 3 inches by 3 inches, is where the laps come. The saw is laid on the shelf, and is fastened with a pair of clamps to hold it in position while applying the heat. When applying the heat the tongs must not be too hot or the saw will be burned, or over-heated. The tongs should be a dark red color, and they should be held on the laps just long enough to heat the laps to a red heat.—*T. F. Googerty.*

Chair Caning.

292. Q:—Can you give me information or the name of a book on heavy caning? It is the kind which is woven tight all over the bottom of the chair. It has no reeds thru the bottom.—*W. C. M.*

A:—The question is rather indefinite but I think the questioner refers to the use of cane webbing which is woven on a loom giving the webbing the appearance of cloth. This webbing is sold by the square foot and is stretched over a frame and then inserted in the seat of the chair. This is the sort of seat commonly found in the seat of reed chairs and also in many piazza chairs. Such webbing may be purchased from L. S. Drake, Inc., West Newton, Mass.

If the questioner has in mind a form of rush seating he will find the best treatise on the subject in "*More Baskets and How to Make them,*" by Mary White. Her chapter on "How to Rush Seat Chairs," tells in detail how to do this form of weaving. The rush may be obtained from L. S. Drake or from any other repairer of reed and willow furniture.—*J. Gilman Rand.*

Scrub Water Color Method.

293. Q:—Will you please explain the scrub water color method?—*M. H.*

A:—Water colors are handled in various ways for different effects.

For sharp, clear, crisp effects the paper is stretched by pasting the edges of dampened paper to a drawing board, or a block of stretched paper is used and the colors are flowed on in successive washes from lightest to darkest tone leaving out the lights and blending or softening with water where necessary.

Illustration board may be used also with this method. The "wet method" so-called, results in softer effects than the above. In this method the paper is laid wet on a wet blotter and as it dries the color is applied allowing the pure colors to mix and blend on the paper. Lights are taken out with a blotter or sponge as the work progresses. This method is difficult but allows much freedom of color if skilfully done.

A third method called the "Dutch method," is probably what you refer to as the "scrub method." In this process the colors are allowed to dry and then are softened and lightened by washing out in part; after which other washes are applied, and the strength of tone and color is built up by successive washes of color with successive washing out with water after each application of color.

These various technical operations hardly warrant the name of distinctive methods. Most water color artists use all of these methods more or less in the operation of painting to secure desired effects.

Perhaps the most important injunction with reference to the use of water colors is to allow the color to settle on the paper thru a body of water rather than to *spread* it on with the brush as in the use of pigments mixed with oil.

Wood Carving Designs.

294. Q:—Will you kindly let me know where I can secure wood carving designs suitable for a beginning class?—*W. C. P. M.*

A:—*Pattern Design* by Lewis F. Day. B. T. Botsford, London.

Meyer's Handbook of Ornament, The Bruno Hessling Co., New York City.

A good practical text on wood carving is:

"*Practical Wood Carving.*" By Eleanore Rowe. John Lane Co., 57 Fifth Ave., New York City.—*E. J. L.*

Text on Lettering.

295. Q:—Please recommend to me a good text on lettering. I wish something for a teacher's book more than for a student's text. It should include both freehand and mechanical lettering for art and mechanical drawing.—*J. W. O.*

A:—*Free Hand Lettering* by Victor T. Wilson. John Wiley & Sons, New York City.

Alphabets Old and New by Lewis F. Day. Chas. Scribner's Sons, New York City.

Lettering by Thomas Wood Stevens. The Prang Company, New York City.

A good book for the construction of block, Roman and Old English is, "*Grammar of Lettering*," by Lyons. J. B. Lippincott Co., London.—*E. J. L.*

Book on Architectural Drawing.

296. Q:—Please give me the names of books on Architectural Drawing.—*J. E. D.*

A:—*Greenberg & Howe's Architectural Drawing.* Price, $1.25. John Wiley & Sons, New York City.

The Radford Architectural Company of Chicago publishes books on building and architecture which are excellent.

The book department of the National Builder; David Williams Company, New York City, gives lists of books on building and architecture.

Texts on Architectural Drafting.

297. Q:—Will you please give me the names of one or two texts that take up the principles of elementary architectural drafting for use in third-year high school, and where they are published?—*W. E. G.*

A:—*Greenberg & Howe's Architectural Drawing.* Price, $1.25. John Wiley & Sons, New York City.

The Radford Architectural Company of Chicago publishes books on building and architecture which are excellent.

The book department of the National Builder; David Williams Company, New York City, gives lists of books on building and architecture.

Books on Woodworking Models.

298. Q:—If you have any books treating on woodwork models suitable for defective children, I will be pleased to know about them.—*B. B. B.*

A:—The following books will be helpful:

Course in Light Woodwork. By J. S. Zerbe. New York Book Company.

Educational Woodwork. By C. A. Horth. $1.00. Spon & Chamberlain, New York, N. Y.

Exercise in Woodwork. By Sickles. Manual Arts Press, Peoria, Ill.

Selected Shop Problems. By Geo. A. Seaton. 20 cents. Manual Arts Press, Peoria.

Educational Woodworking for Home and School. By J. C. Park. The Macmillan Company, New York, N. Y.

Foster's Elementary Woodworking. By Edwin W. Foster. 60 cents. Ginn & Company, Boston.

Problems in Woodworking. By M. W. Murray. $1.00. Manual Arts Press, Peoria.

Woodworking for Beginners. By Chas. G. Wheeler. $2.50. G. P. Putnam & Sons, New York City.

Woodwork for Schools. By J. T. Bailey and S. Pollitt. 75 cents. Manual Arts Press, Peoria.

Woodwork for the Grades. $1.25. Manual Arts Press, Peoria, Ill.

Films on Industries.

300. Q:—Can you give me the names of any firms who can furnish reels on the industrial arts, particularly manual training?—*E. L. W.*

A:—The following firms handle educational films and list several pertaining to the industrial arts: Atlas Educational Film Co., 5 S. Wabash Ave., Chicago, Ill.; General Film Co., 200 Fifth Ave., New York; Pathescope Co., New York, Chicago and Boston.

The Bureau of Commercial Economics, Inc., Washington, D. C., has a large list of commercial and industrial films which can be obtained free thru co-operating educational institutions. In Mississippi the University is the distributor.

Books on Gas Engines.

302. Q:—Will you suggest a good book on Gas Engines, auto and stationary, suitable for farm boys? Please state where these books may be purchased.—*C. O. G.*

A:—The books listed below will be of value in a study of gas and farm engines:

Automobile Encyclopedia. 1913 edition. By A. L. Dyke. A. L. Dyke & Co., St. Louis. Price, $3.

Internal Combustion Engines. (Chapter on gas and oil engines.) By J. K. Barton. United States Naval Institute, Annapolis, Md. Price, $1.50.

The Gas and Oil Engine. By D. Clerk. John Wiley & Sons, New York. Price, $4.

Audel's Gas Engine Manual. By Theo. Audel. Theo. Audel & Co., New York. Price, $2.

Gas and Oil Engine Management. By M. P. Bale. J. B. Lippincott Co., Philadelphia, Pa. Price, $1.50.

Maule's Latest Automobile Engine. By H. E. Maule. Boys' Book of New Inventions, 1914.

Gas, Gasoline and Vapor Engines. By C. D. Hiscox. N. W. Henley & Co., New York.

The Gas Engine. By F. R. Hutton. John Wiley & Sons, New York. Price, $5.

Design and Construction of Oil Engine. $2.50.

Gas Engine in Theory and Practice. By A. H. Goldingham. Spon & Chamberlain, New York. $1.50.

Handbook on Gas Engines. By H. Haeder. McGraw-Hill Co., New York. Price, $5.

Gas and Petrol Engines. By H. de Graffigny. The Macmillan Company, New York. Price, 75 cents.

The Gas Engine. By F. R. Jones. John Wiley & Sons, New York. Price, $4.

Steam, Gas and Oil Engines. By J. Perry. The MacMillan Company, New York. Price, $3.25.

Gas Engine Construction. By H. O. Parsell and A. J. Weed. N. W. Henley & Co., New York. Price, $2.50.

Motor Car Mechanism. By W. E. Dommett. D. Van Nostrand Company, New York. Price, $1.25.

Elements of Machine Work. By Robert H. Smith. Industrial Education Book Co., Boston. Price, $2.00.

Gas and Oil Engines. By A. Kirschke. D. Van Nostrand Company, New York. Price, $1.25.

Gas Engines. By W. J. Marshall and H. R. Sankey. D. Van Nostrand Company, New York. Price, $2.

Gas Engine Handbook. By S. W. Roberts. Gas Engine Publishing Company, Cincinnati, O. Price, $2.

The Farm Gas Engine. By C. F. Hirschfeld and T. C. Ulbricht.

Farm Engines and How to Run Them. By J. H. Stephenson. F. J. Drake & Co., Chicago. Price, $1.

The Gasoline Engine on the Farm. By X. W. Putnam. N. W. Henley Co., New York.

Irvington, N. J. The school board has accepted an offer of the Essex County Vocational School to establish night classes in vocational subjects in the city. It is planned to hold classes in dressmaking, millinery, cooking and printing.

Philadelphia, Pa. One-half of one of the floors of the Wanamaker Store has been recently dedicated to the education of the employes. The new department has received the name of University Hall and has been completely equipped for practical school work. It comprises an auditorium with a seating capacity of more than 2,000 persons and a number of classrooms in which the students may study. It is planned to organize a faculty to teach the students.

Brooklyn, N. Y. A co-operative plan of commercial work has been put into operation at the Commercial High School. Under the direction of Mr. F. L. Bickmore, the students are placed in the offices of local commercial houses where they are given the opportunity of learning business practice thru actual performance. A class of forty boys is now successfully working under the co-operative plan. Each student spends one week in the business office and one week in school. The Commercial High School has both three-year and four-year courses, and students of the latter are eligible for co-operative work.

The co-operative plan does not seek primarily to provide positions for the students but merely to give greater opportunities for the boys who take the course. The wages range from $5 to $10 per week. The students are placed only in the largest business concerns where their chance for promotion will be good after they have completed the course.